TOSHIBA

FILE NO. 030-9601

TOSH-02022

# SERVICE MANUAL

# COLOUR TELEVISION

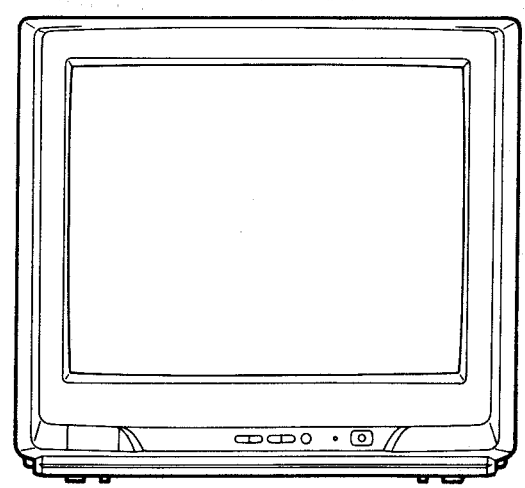
C4E-R Chassis

# 2150RN

## – SUMMARY –

2150RN is the same as 2150TN except for the following parts.
Use this service manual together with the original service manual 2150TN File No. 030-9526.

1989



PRINTED IN JAPAN, Jan., 1996 (So)

2022

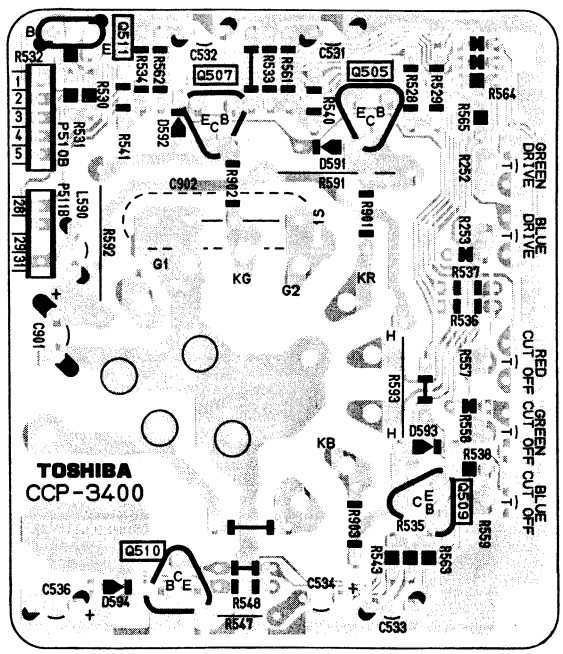
# REPLACEMENT PARTS LIST DIFFERENCES

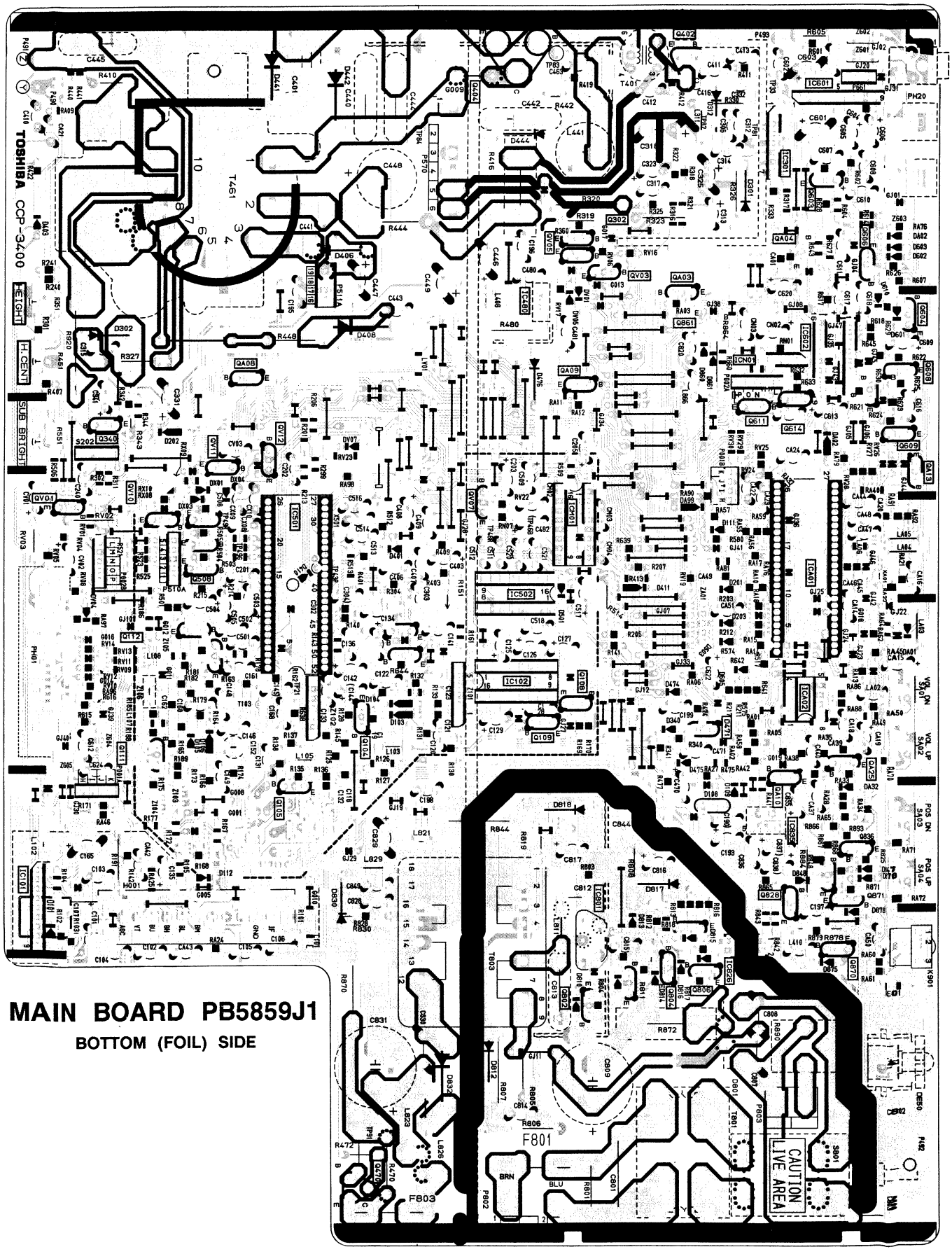
2150RN is not equipped with Teletext circuit, and the related parts are changed as well.

| Location No. | 2150TN (Base model) | | 2150RN | |
|---|---|---|---|---|
| | Part No. | Description | Part No. | Description |
| U902A | 23704923 | Main Board, PB5860D1 | 23704830 | Main Board, PB5859J1 |
| U902B | 23704924 | CRT Drive Board, PB5860D2 | 23704940 | CRT Drive Board, PB5859J2 |
| CA22 | 24590104 | PF, 0.1μF | – | Not in use |
| CA23 | 24590104 | PF, 0.1μF | – | Not in use |
| CA24 | 24590104 | PF, 0.1μF | – | Not in use |
| CA44 | 24794470 | EL, 47μF, ±20%, 16V | – | Not in use |
| CA47 | 24212103 | CD, 0.01μF, ±10% | 24473220 | CD, 22pF |
| CA48 | 24232103 | CD, 0.01μF, +80%, -20% | 24473220 | CD, 22pF |
| CA51 | 24474101 | CD, 100pF, ±10% | – | Not in use |
| R509 | 24366433 | CF, 43k ohm | 24366183 | CF, 18k ohm |
| R574 | 24366153 | CF, 15k ohm | 24366622 | CF, 6200 ohm |
| R575 | 24366103 | CF, 10k ohm | 24366133 | CF, 13k ohm |
| R581 | 24366102 | CF, 1k ohm | – | Not in use |
| R864 | 24382560 | OMF, 56 ohm, 1W | – | Not in use |
| R870 | 24383103 | OMF, 10k ohm, 2W | 24383822 | OMF, 8200 ohm, 2W |
| RA14 | – | Not in use | 24366102 | CF, 1k ohm |
| RA15 | – | Not in use | 24366102 | CF, 1k ohm |
| RA16 | – | Not in use | 24366102 | CF, 1k ohm |
| RA18 | – | Not in use | 24366561 | CF, 560 ohm |
| RA35 | 24366223 | CF, 22k ohm | 24366471 | CF, 470 ohm |
| RA36 | 24366102 | CF, 1k ohm | – | Not in use |
| RA37 | 24366273 | CF, 27k ohm | – | Not in use |
| RA40 | 24366102 | CF, 1k ohm | – | Not in use |
| RV24 | 24366621 | CF, 620 ohm | – | Not in use |
| RV25 | 24366621 | CF, 620 ohm | – | Not in use |
| RV26 | 24366101 | CF, 100 ohm | 24366391 | CF, 390 ohm |
| RV27 | 24366101 | CF, 100 ohm | 24366391 | CF, 390 ohm |
| RV28 | 24366101 | CF, 100 ohm | 24366391 | CF, 390 ohm |
| RV29 | 24366681 | CF, 680 ohm | – | Not in use |
| RV30 | 24366681 | CF, 680 ohm | – | Not in use |
| RX08 | 24366391 | CF, 390 ohm | 24366222 | CF, 2200 ohm |
| RX09 | 24366391 | CF, 390 ohm | 24366222 | CF, 2200 ohm |
| RX10 | 24366391 | CF, 390 ohm | 24366222 | CF, 2200 ohm |
| LA04 | 23103859 | Coil (Ferrite Bead), TEM2011 | – | Not in use |
| LA05 | 23103859 | Coil (Ferrite Bead), TEM2011 | – | Not in use |
| LA06 | – | Not in use | 23238708 | Coil, Peaking, TRF4330AJ |
| D860 | 23316674 | Diode, Zener, MTZJ6.2A | – | Not in use |
| Q861 | A6333346 | Transistor, 2SC2655-Y(C) | – | Not in use |
| K902 | 23306084 | Remote Hand Unit, CT-9784 | 23120954 | Remote Hand Unit, CT-9736 |
| A201 | 23410243 | Front Cover | 23410241 | Front Cover |
| A401 | 23425816 | Back Cover | 23426841 | Back Cover |
| A411 | 23569007 | Label, Model No., B/C | 23569876 | Label, Model No., B/C |

# CRT DRIVE BOARD PB5859J2

## BOTTOM (FOIL) SIDE






# MAIN BOARD PB5859J1

**BOTTOM (FOIL) SIDE**

# SCHEMATIC DIAGRAM MODEL: 2150RN

**CAUTION:** The international hazard symbols "⚠" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

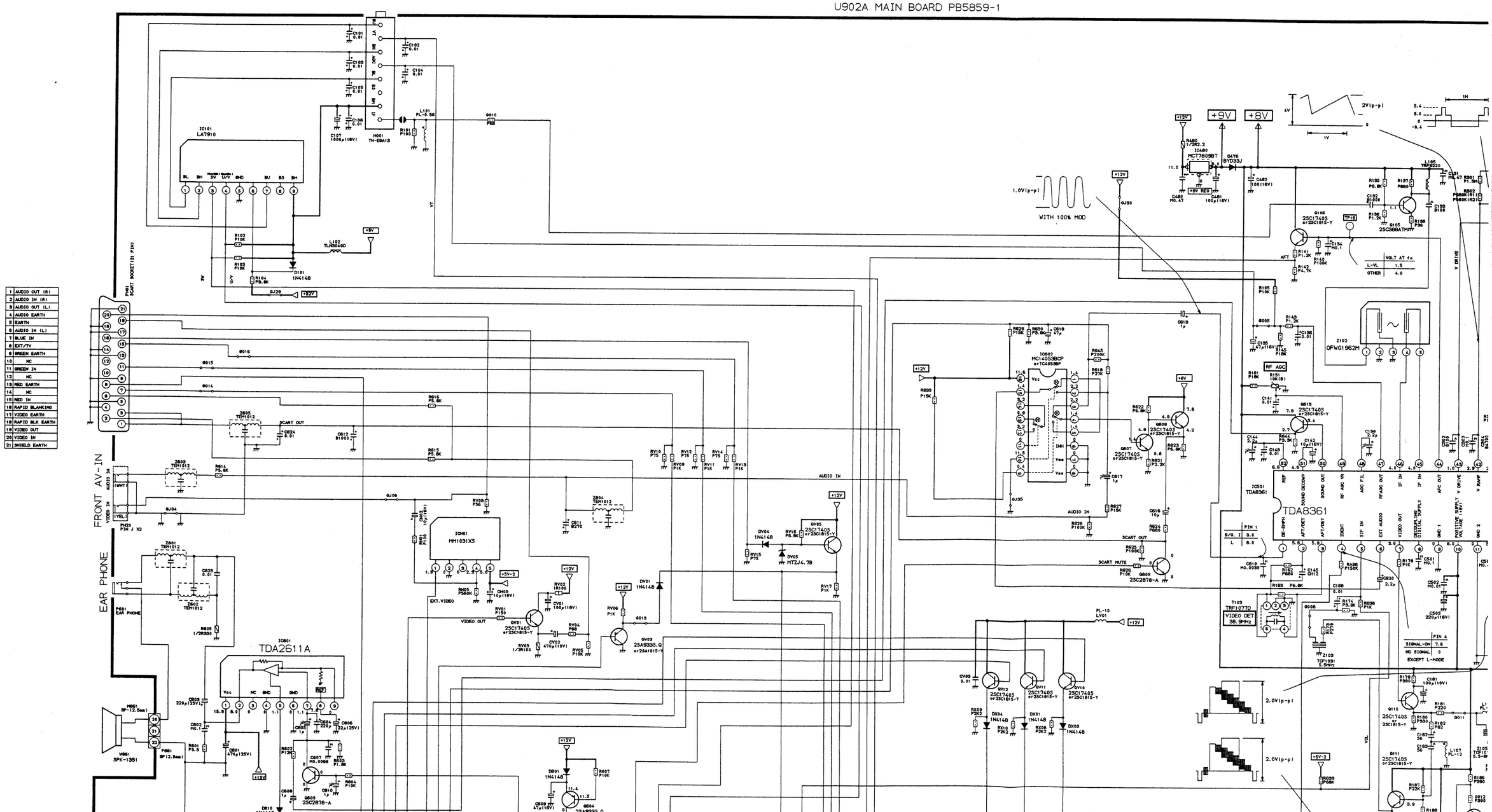
**OBSERVATION OF VOLTAGES AND WAVEFORMS**

1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal. Voltages reading may vary ±20%.
2. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
3. Waveforms are taken using a standard colour bar signal.
4. Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.

**NOTES:**

1. D.C. resistance v
   gram. These are r
2. The circuits are su
3. ● : Solder link

U902A MAIN BOARD PB5859-1



PRIMARY CIRCUIT

SECONDARY CIRCUIT

CAUTION
LIVE AREA

EAR PHONE

SHIELD

PB3C05S/BBP/158

TDA2611A

VIDEO DET

EXT. VIDEO

INT. VIDEO

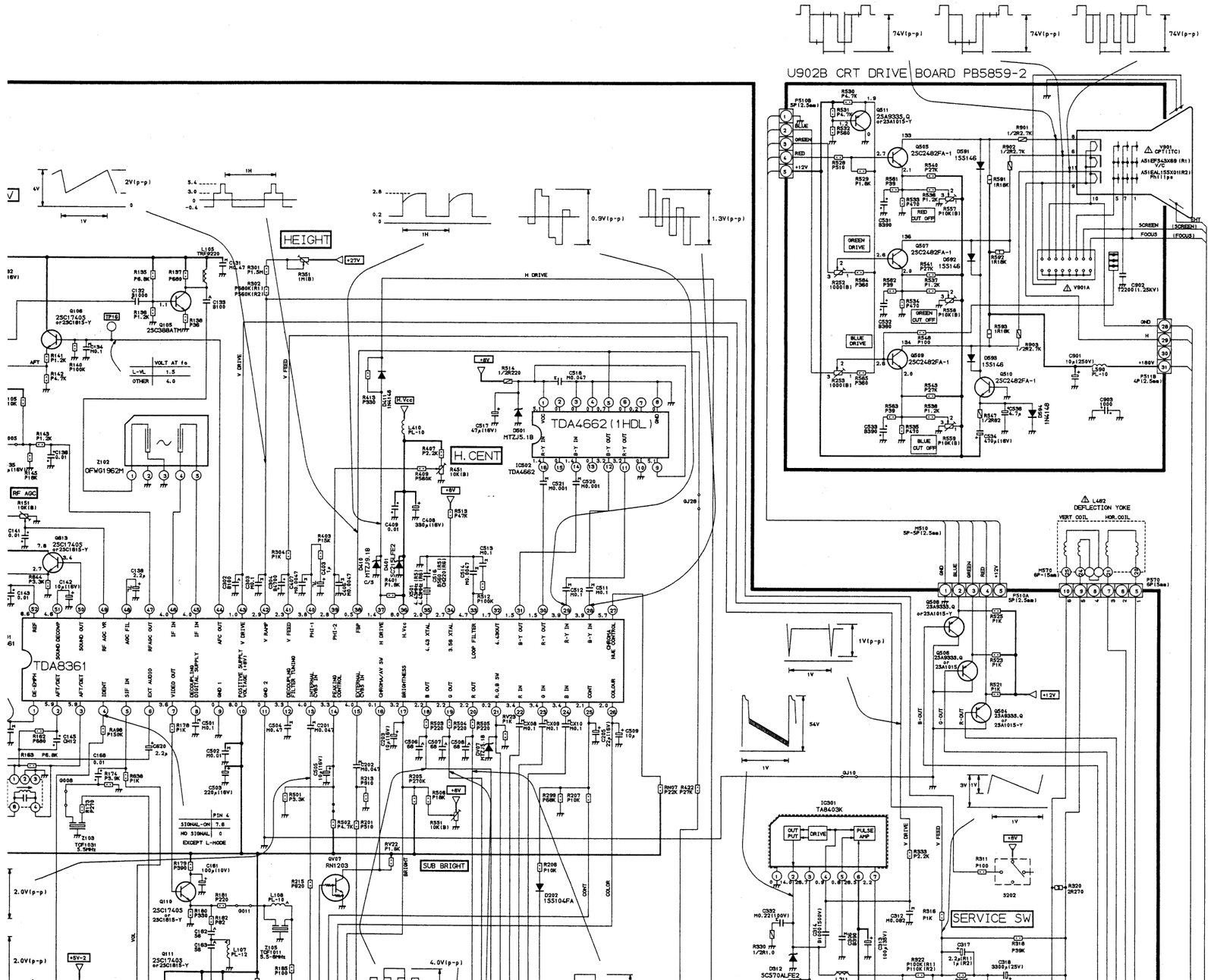
**NOTES:**

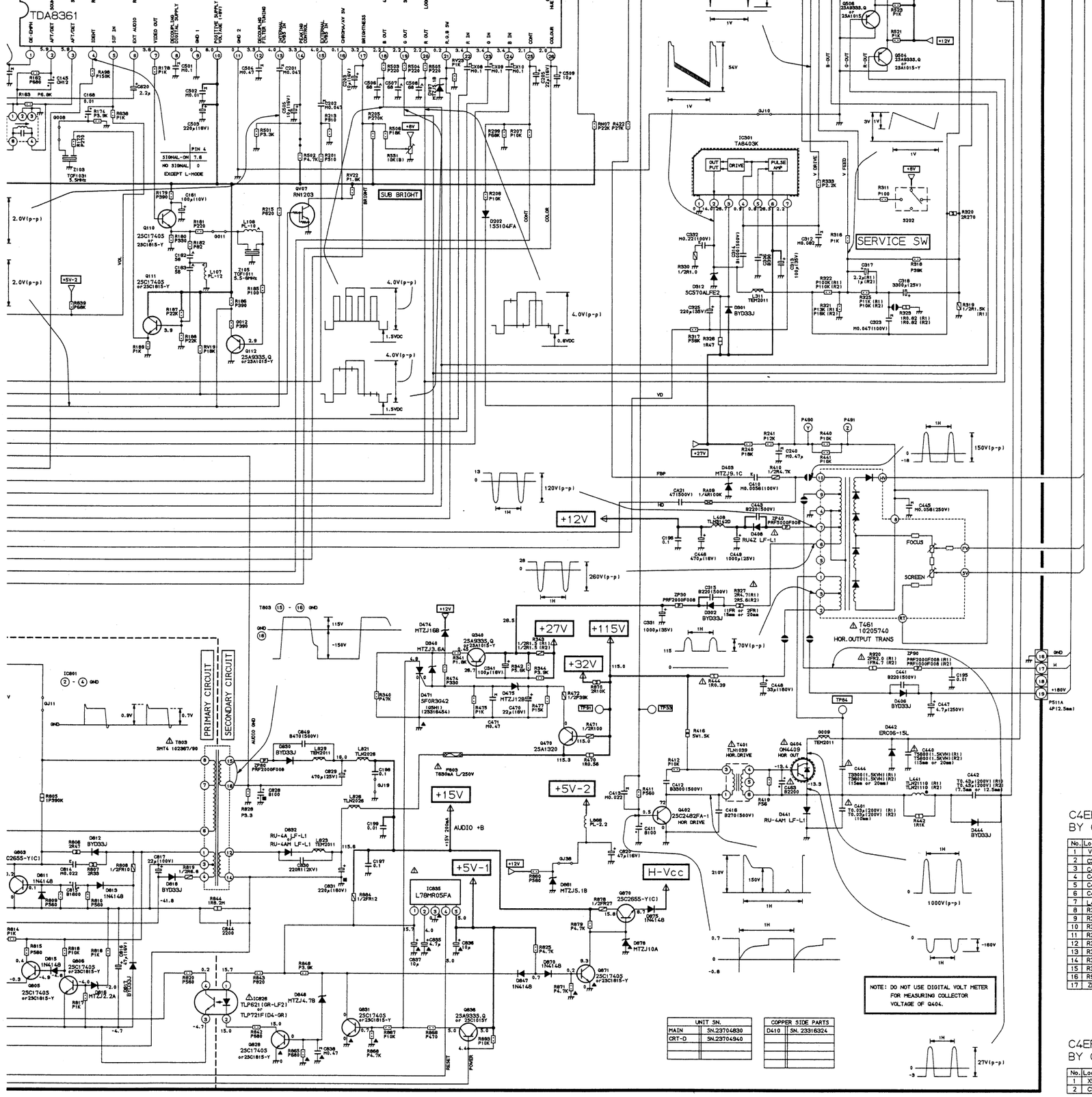
1. D.C. resistance value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⊖ : Solder links.

## EXPRESSION

### VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.






| UNIT SN. | |
|---|---|
| MAIN | SN.23704830 |
| CRT-D | SN.23704940 |
| | |
| | |

| COPPER SIDE PARTS | |
|---|---|
| D410 | SN. 23316324 |
| | |
| | |
| | |
| | |

C4ER CIRCUIT SPEC CONPONENT VALUES BY CPT TYPE

| No. | Loc.No. | R1 | R2 |
|---|---|---|---|
| 1 | V901 | A51EF543X69(VIDEO COLOR) | A51EAL155X01(PHILIPS) |
| 2 | C317 | T2.2μ | T1μ |
| 3 | C401 | T0.03μ(200V) | T0.03μ(200V) |
| 4 | C440 | T5600(1.5KVH) | T5600(1.5KVH) |
| 5 | C442 | T0.43μ(200V) | T0.43μ(200V) |
| 6 | C444 | T3300(1.5KVH) | T3600(1.5KVH) |
| 7 | L441 | TLN2111G | TLN2111G |
| 8 | R302 | P680K | P560K |
| 9 | R319 | 1/2R2.7K | NOT REQ'D |
| 10 | R321 | P13K | P16K |
| 11 | R322 | P100K | P110K |
| 12 | R323 | 1R0.82 | 1R0.82 |
| 13 | R325 | P11K | P10K |
| 14 | R327 | P4.7 | P5.6 |
| 15 | R343 | 1/2R1.5 | 1/2R1.5 |
| 16 | R920 | 2FR2.0 | 1FR4.7 |
| 17 | ZP90 | PRF2000F008 | PRF1000F008 |

C4ER CIRCUIT SPEC COMPONENT VALUES BY CRYSTAL TYPE(SUPPLIER)

| No. | Loc.No. | R5 | R6 |
|---|---|---|---|
| 1 | X501 | 4.43MHz (N.D.K.) | 4.43MHz (PHILIPS) |
| 2 | C516 | B560 | CH220 |

TOSHIBA

FILE NO. 030-9526

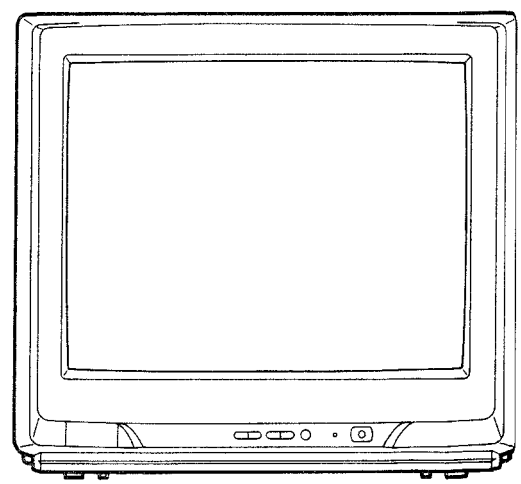
TOSH- 01989

SERVICE MANUAL

# COLOUR TELEVISION

C4E-R Chassis

# 2150TN



PRINTED IN JAPAN, Dec ., 1985 (So)

1989

# SAFETY INSTRUCTIONS

**WARNING**: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

## X-RAY RADIATION PRECAUTION

1. The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 28.6 kV at zero beam current (minimum brightness) operating at 220V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 29.5 kV. When checking the E.H.T., use the 'High Voltage Check' procedure in this manual using an accurate E.H.T. voltmeter.
2. The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
3. Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation.
   For continued safety, replacement component should only be made after referring the Product Safety Notice below.

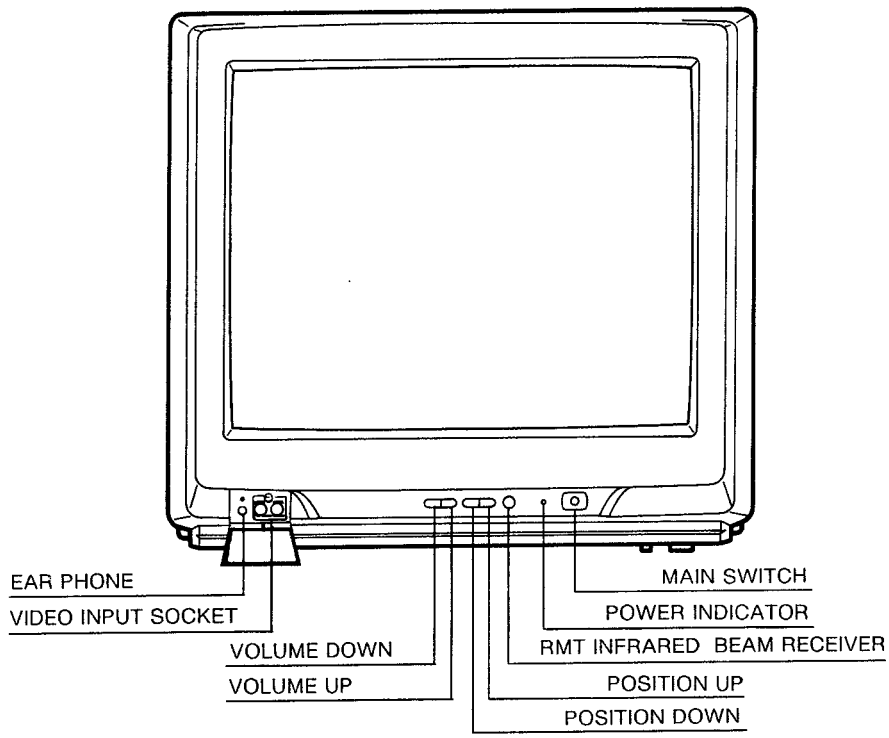
## SAFETY PRECAUTION

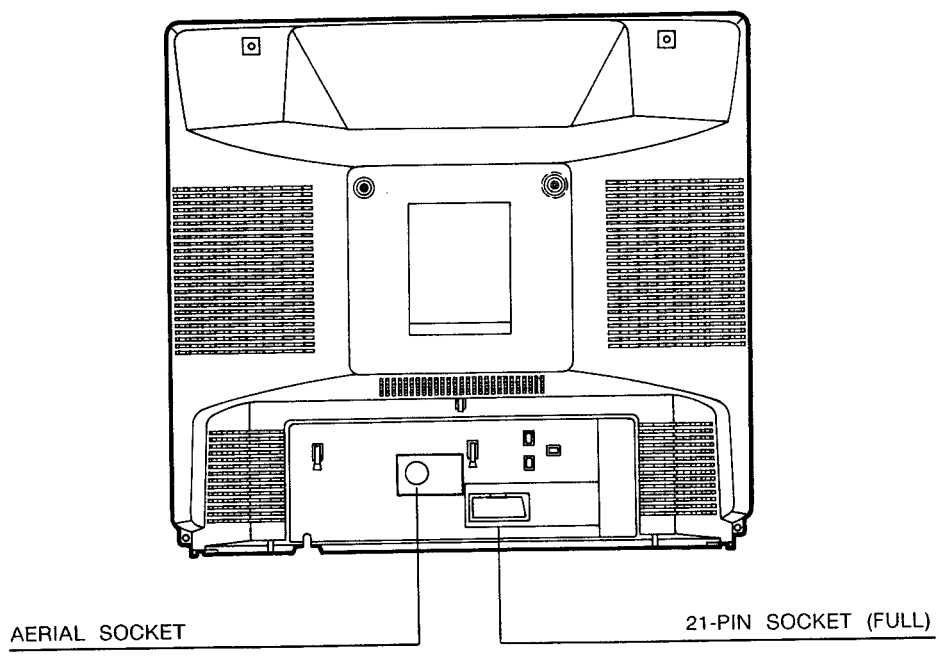
1. This receiver has a nominal working E.H.T. voltage of 26.0 kV. Extreme caution should be exercised when working on the receiver with the back removed.
   Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment.
   When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap
   The C.R.T., if broken, will violently expel glass fragments. Use shatter proof goggles and take extreme care while handling.
   Do not hold the C.R.T. by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
3. A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
4. Replace blown fuses within the receiver with the fuse specified in the parts list.
5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
6. Keep wires away from high temperature components.

## PRODUCT SAFETY NOTICE

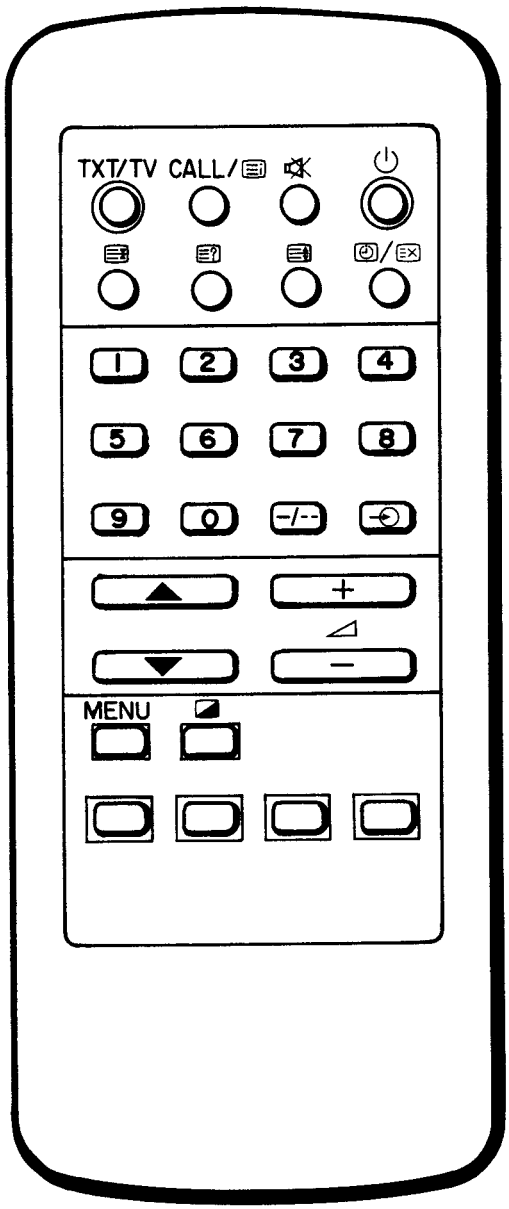
Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the schematic diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

# FRONT CONTROLS AND REAR VIEWS



# REMOTE HAND HELD UNIT




CT-9784

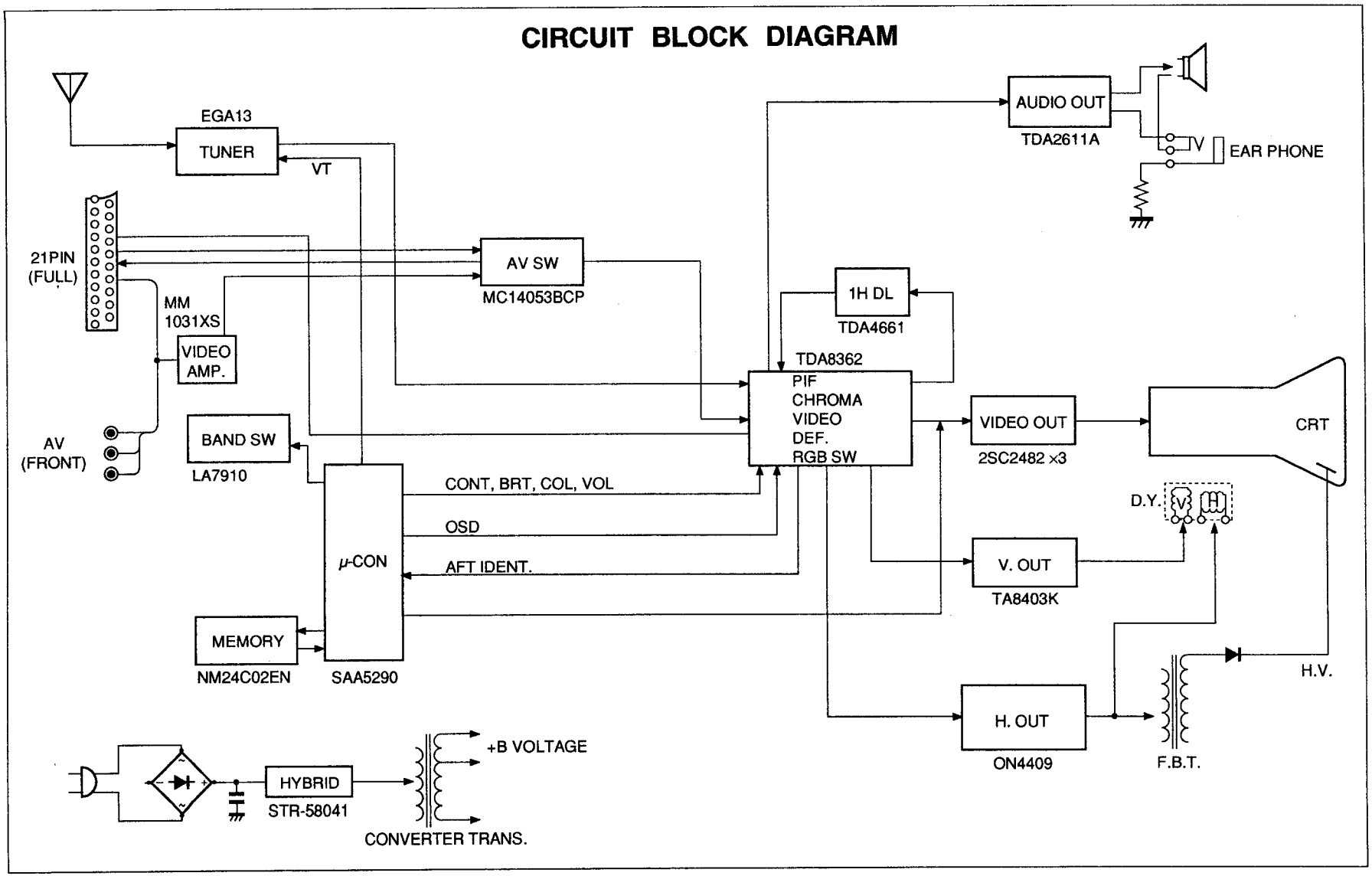
**KEY ASSIGNMENT**

- ⏻ ..... ON/STAND-BY
- 🔇 ..... MUTE
- CALL ..... DISPLAY CALL
- MENU..... TUNING & OTHER MENU
- ◪ ..... PICTURE MENU
- 1~9, 0 ... TEN KEY
- - / - - ..... 1 or 2 place
- ⏻ ..... VIDEO INPUT (EXTERNAL INPUT SOURCE SW.)
- ◿ ..... VOLUME
- \+ ..... LEVEL PLUS (VOLUME, MENU)
- − ..... LEVEL MINUS (VOLUME, MENU)
- ▲ ..... UP (POSI., CH., TEXT PAGE)
- ▼ ..... DOWN (POSI., CH., TEXT PAGE)

TELE-TEXT

- TXT/TV..... TEXT, MIX, TV MODE SW.
- ..... HOLD
- ..... <TEXT MODE> ..... REVEAL / CONCEAL
- ..... <TEXT MODE> ..... F-T-B (FULL, TOP, BOTTOM)
- /EX ..... TIME DISPLAY (TV MODE) TEXT CLEAR (TEXT MODE)
- ..... INDEX, INITIAL
- FLOF COLOUR KEY (4 key used) Red/Green/Yellow/Blue

# CIRCUIT BLOCK DIAGRAM



**WARNING**: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

# INSTALLATION AND SERVICE ADJUSTMENTS

### GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.
This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials.
Plug the power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

### AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 30 minutes in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures.

### HIGH VOLTAGE CHECK

**CAUTION**: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

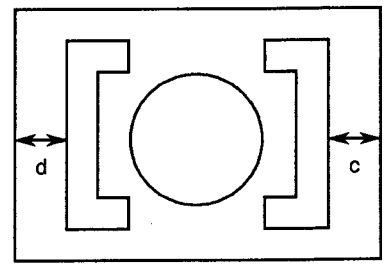
1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 29.5 kV.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 29.5 kV under any conditions.

### HEIGHT ADJUSTMENT

1. Receive the WG PHILIPS pattern, and set the contrast and colour to minimum, and the brightness to centre.
2. Adjust HEIGHT Control (R351) so that white blocks at top and bottom of the picture are just masked.

### HORIZONTAL CENTRE ADJUSTMENT

1. Receive the WG PHILIPS pattern.
2. Set the contrast and colour to minimum, and the brightness to centre.
3. Adjust H. CENTER SUB Control (R451) so the pattern can be located for d-c to be +4.0 mm.




### FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

### DELAYED R-F AGC ADJUSTMENT

1. Tune the set in the strongest station in your area.
2. Turn AGC DELAY Control (R151) on MAIN Board to fully counterclockwise position.
3. Adjust AGC DELAY Control clockwise until noise (snow) disappears on the screen.

## CRT GREY SCALE ADJUSTMENT

1. Press VIDEO INPUT button on Remote Control unit to turn TV to video input mode. (Video input should have no signal.) Next press PICTURE SELECT button to select function and set CONTRAST to minimum, BRIGHTNESS to maximum, COLOUR to minimum.
2. Turn the SCREEN Control (on T461) fuly counter-clockwise.
3. Set the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) counterclockwise to the centre position.
4. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the centre position.
5. Set the CUT OFF SW. (S202) in the H. line position.
6. Set the SUB BRIGHTNESS Control to minimum.
7. Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen. Set the SCREEN Control to this position.
8. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE). The lines may look like white if the CUT OFF Controls are adjusted properly.
9. Return the CUT OFF SW. (S202) in the receiving position. Press VIDEO INPUT button to turn TV to the TV mode.
10. Set the BRIGHTNESS Control to the maximum and COLOUR Control to the centre.
11. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
12. Set the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.

## SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme of Philips pattern.
2. Set the CONTRAST Control to the minimum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR Control to the minimum.
4. Set the SUB-BRIGHT. Control (R551) so that the voltage across terminals Y-Z can be $0.2 \pm 0.05$V with voltmeter and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

## BUS DATA SETTING

1. In the TV set of initial lot of production, SAA5290ZP/024 is used for QA01. But replace with SAA5290ZP/032 for servicing.
2. When QA01 only is replaced, it is not necessary to change the mode data.
3. When memory IC (QA02) is replaced, change the mode data in the manner below.

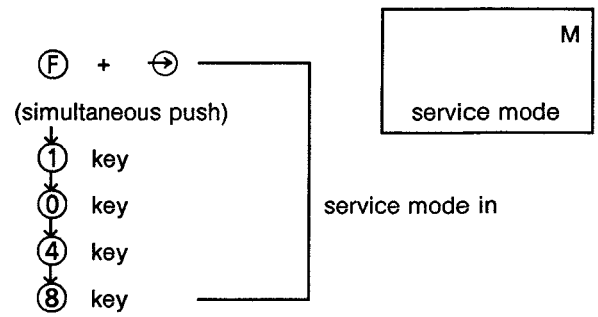
## ADJUSTMEN METHOD FOR SERVICING

### 1.OUTLINE

In the service mode, MODE DATA adjustments can be made easily with user remote control unit. (CT-9689 only)

### 2.SERVICE MODE OPERATION

**2-1. How to Enter the Service Mode**




**2-2. How to Exit from the Service Mode**

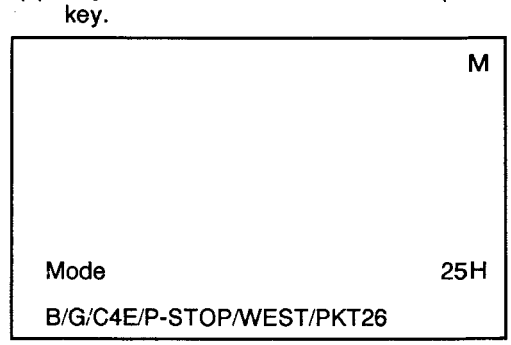
Exit the service mode by turning the power on/off with the remote control.

### 3. ADJUSTMENT IN THE SERVICE MODE

Service Mode Level Adjustments

(1) Push Ⓕ + ◪ key (simultaneous push) to appear Mode Data to be adjusted.

(2) Adjust with the level UP/DOWN (VOL UP/DOWN) key.




Example of screen display in level adjustment

# PICTURE I-F ALIGNMENT

GENERAL ..... Refer to figure 4 for test equipment connection.
PRELIMINARY STEPS ..... Supply +5 volts to the 5V-1 line.
SIGNAL GENERATOR ..... Connect to both leads of R101 with signal level of 75 dBμ, and open the solder-link at IF OUT of tuner on the Main Board. (See figure 4.)
DVM ..... Connect to pin #44 of IC501 on the Main Board through the detector.

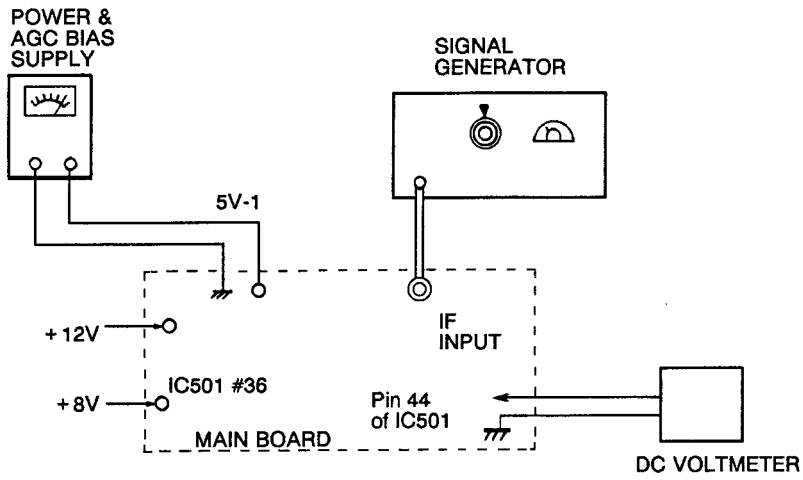


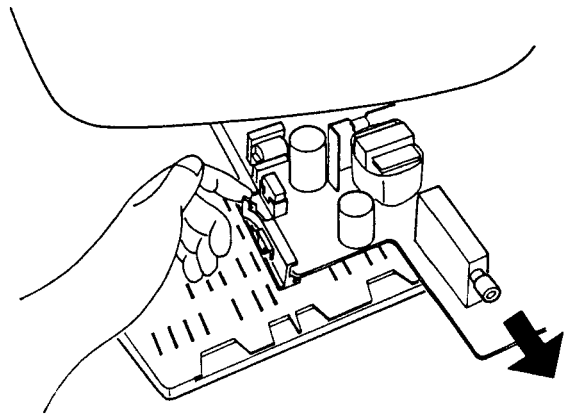

**Figure 4. Picture IF Alignment**

| STEP | SIGNAL GENERATOR | ADJUST | REMARKS |
|---|---|---|---|
| Detector Coil | 38.9 MHz CARRIER WAVE (Level 75 dBμ) | T103 | 1. Supply external DC power (+5V) to 5V-1 line.<br>2. Supply +8V to pin 36 of IC501.<br>3. Supply external DC power to +12V line.<br>4. Apply test signal to IF input.<br>5. Adjust T103 so that DC voltage at pin 44 of IC501 becomes 3.5V ± 0.5V. |
| After completing the above steps, disconnect the equipment and re-solder the links on the Main Board, and adjust the AGC Delay Control (R151) following DELAYED RF AGC ADJUSTMENTS. | | | |

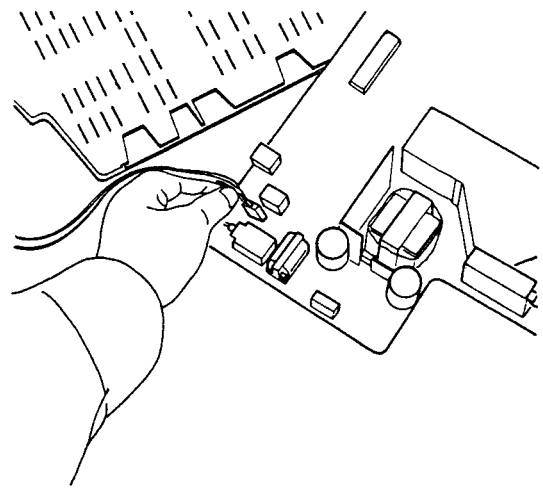
# 2150 SERIES : SERVICE POSITION INFORMATION

When repairing the units of 2150 Series, make sure to retain the chassis in the following procedure.

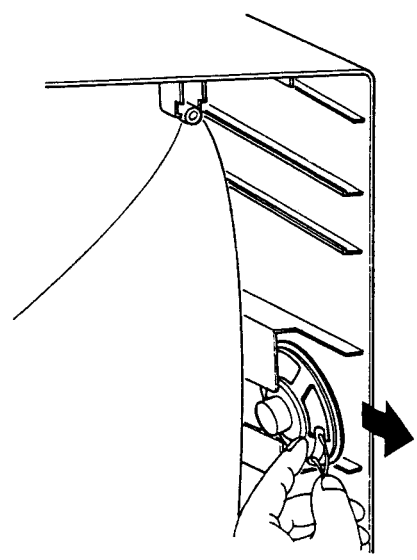
1. Open the hook at the left of the rail retaining the chassis with finger to release the lock, and pull the chassis to your side.



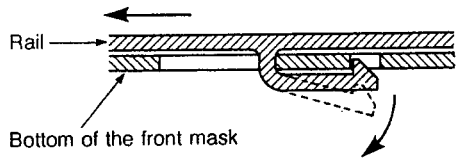
2. Remove the connector of the DG (degausser) coil from the main p.c. board.

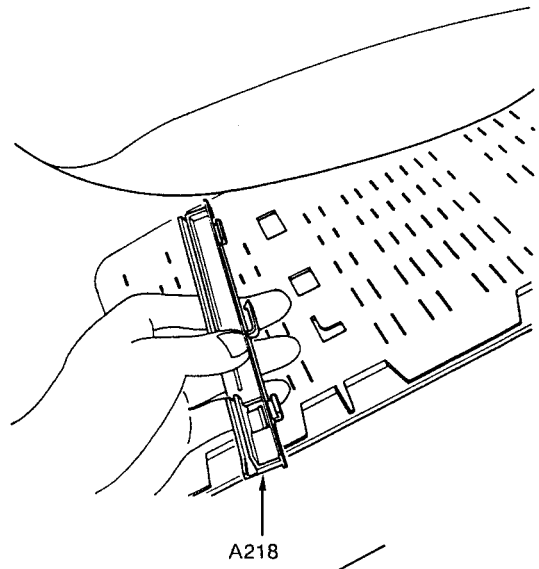


3. Peel the holding tape off the speaker leads, and remove the speaker from the front cover.

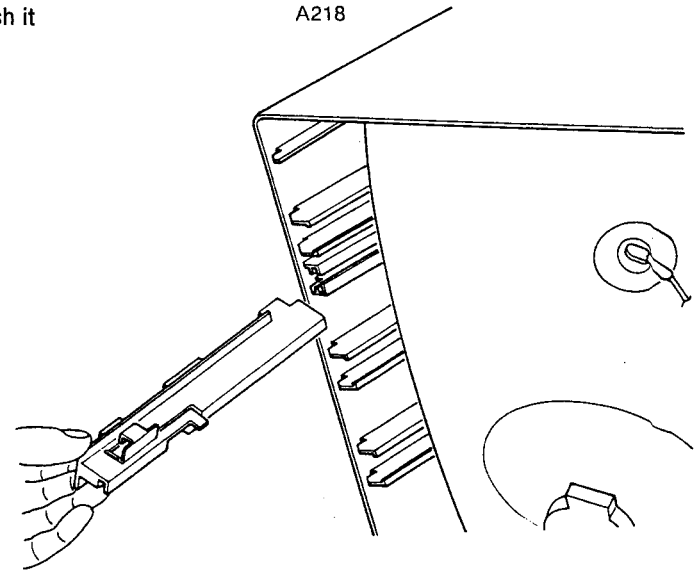


4. Remove the detachable rail A218 (left side).
   (Since a hook is provided at the center of the rail, access the hook from the back side of the bottom of the front mask and bend it to release the lock, and then, pull the rail to your side to remove.

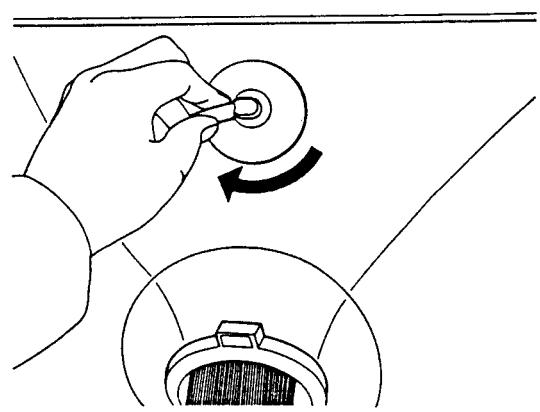


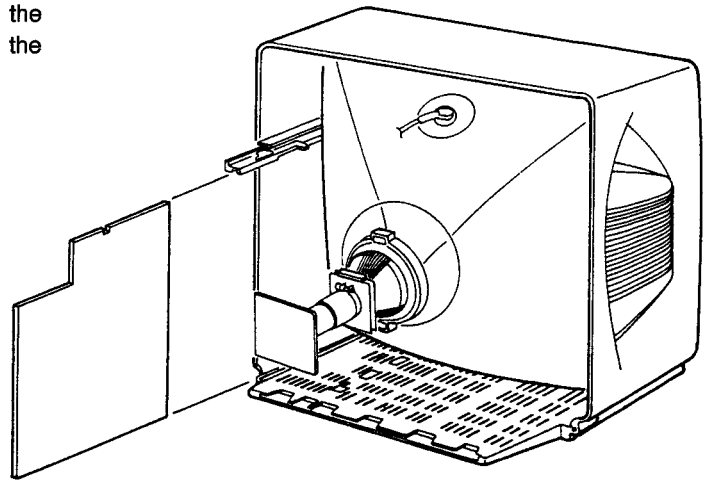

5. Insert the detachable rail A218 into the service slot for the rail at the left side of the front cover. (Push it until it touches the stopper.)

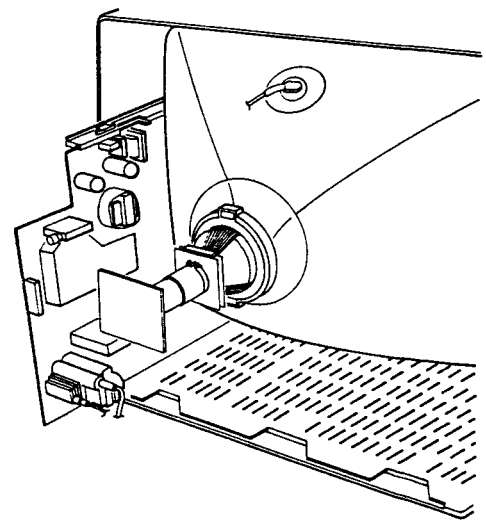


6. Twist the anode cap clockwise.
   (Pay enough care not to disconnect it.)



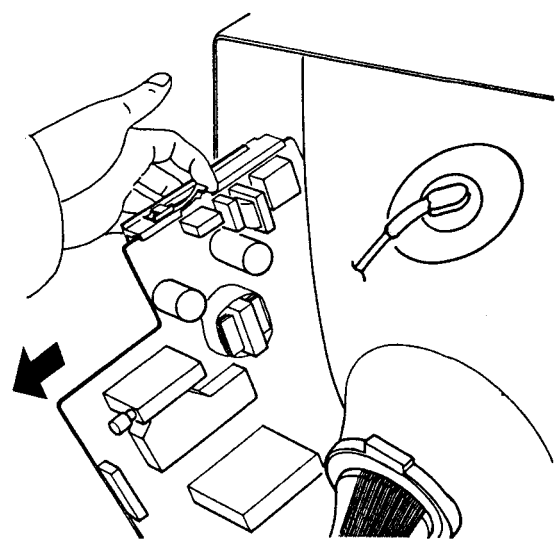
7. Insert and retain the main p.c. board between the above-mentioned detachable rail and the rib at the bottom left.
(Insert it until the hook engages to lock.)



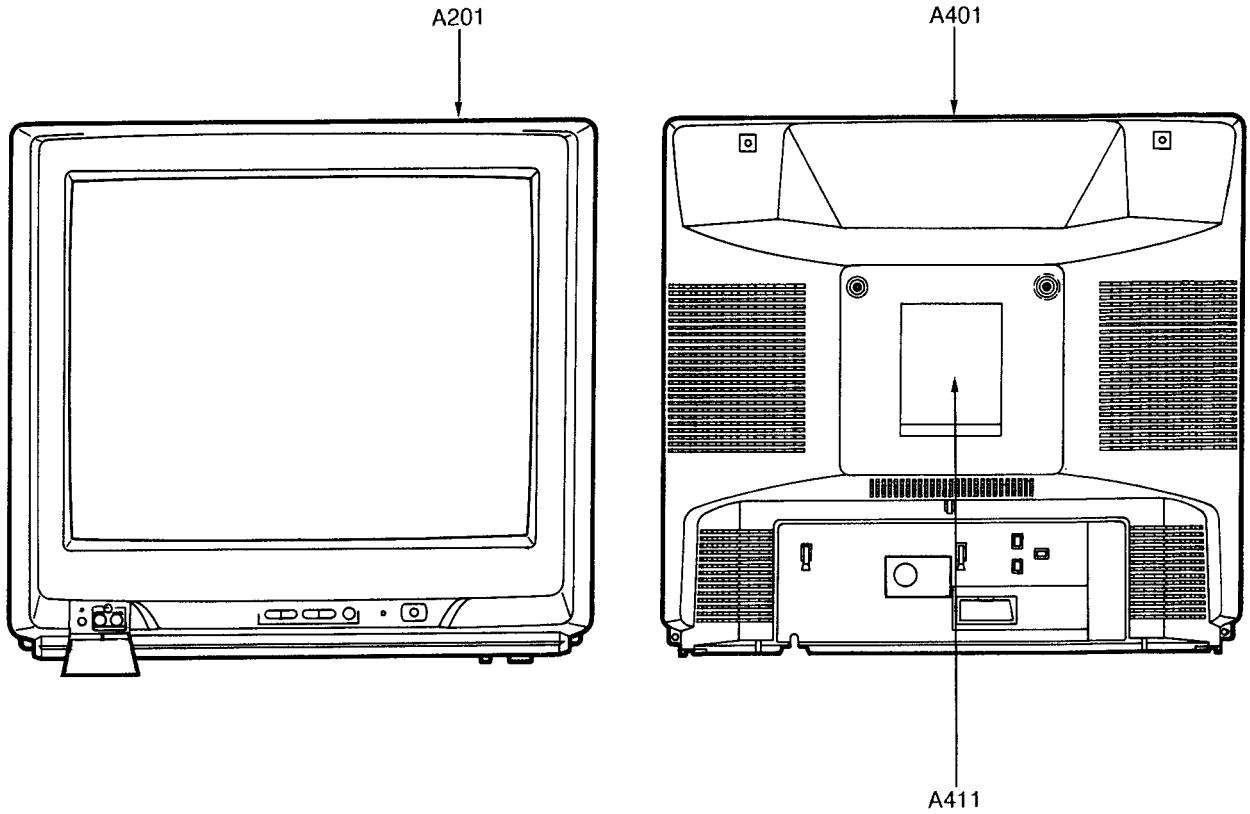


Retaining condition for servicing

8. After completion of the repair works, lift up the hook, release the lock and reverse the above procedure to restore it.



# CABINET REPLACEMENT PARTS LIST




| Location No. | Part No. | Description |
|---|---|---|
| A201 | 23410243 | Front Cover |
| A218 | 23421601 | Rail, Left (See page 10) |
| ⚠A401 | 23425816 | Back Cover |
| A411 | 23569007 | Label, Model No. |

# CHASSIS REPLACEMENT PARTS LIST

**WARNING**: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

**CAUTION**: The international hazard symbols " ⚠ " in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

*NOTICE:*
- *The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.*
- *The PC board assembly with * mark is no longer available after the end of the production.*

**ABBREVIATIONS:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Capacitors..... | CD | : Ceramic Disk | PF | : Plastic Film | EL | : Electrolytic |
| Resistors..... | CF | : Carbon Film | CC | : Carbon Composition | MF | : Metal Film |
| | OMF | : Oxide Metal Film | VR | : Variable Resistor | FR | : Fusible Resistor |

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

| Location No. | Part No. | Description |
|---|---|---|
| **CAPACITORS** | | |
| C101 | 24232103 | CD, 0.01μF, +80%, -20% |
| C102 | 24232103 | CD, 0.01μF, +80%, -20% |
| C103 | 24232103 | CD, 0.01μF, +80%, -20% |
| C104 | 24232103 | CD, 0.01μF, +80%, -20% |
| C105 | 24232103 | CD, 0.01μF, +80%, -20% |
| C106 | 24232103 | CD, 0.01μF, +80%, -20% |
| C107 | 24794102 | EL, 1000μF, ±20%, 16V |
| C131 | 24538474 | PF, 0.47μF |
| C132 | 24474102 | CD, 1000pF, ±10% |
| C133 | 24474101 | CD, 100pF, ±10% |
| C134 | 24590104 | PF, 0.1μF |
| C135 | 24794470 | EL, 47μF, ±20%, 16V |
| C136 | 24232103 | CD, 0.01μF, +80%, -20% |
| C138 | 24206229 | EL, 2.2μF, 50V |
| C141 | 24232103 | CD, 0.01μF, +80%, -20% |
| C142 | 24794100 | EL, 10μF, ±20%, 16V |
| C143 | 24232103 | CD, 0.01μF, +80%, -20% |
| C144 | 24206229 | EL, 2.2μF, 50V |
| C145 | 24353120 | CD, 12pF |
| C161 | 24793101 | EL, 100μF, ±20%, 10V |
| C162 | 24473560 | CD, 56pF |
| C163 | 24473560 | CD, 56pF |
| C168 | 24232103 | CD, 0.01μF, +80%, -20% |
| C190 | 24232103 | CD, 0.01μF, +80%, -20% |
| C193 | 24797229 | EL, 2.2μF, ±20%, 50V |
| C195 | 24232103 | CD, 0.01μF, +80%, -20% |
| C196 | 24590104 | PF, 0.1μF |
| C197 | 24590104 | PF, 0.1μF |
| C198 | 24590104 | PF, 0.1μF |
| C199 | 24232103 | CD, 0.01μF, +80%, -20% |
| C201 | 24590473 | PF, 0.047μF |
| C202 | 24590473 | PF, 0.047μF |
| C203 | 24794100 | EL, 10μF, ±20%, 16V |
| C205 | 24794220 | EL, 22μF, ±20%, 16V |
| C240 | 24538474 | PF, 0.47μF |
| C302 | 24474101 | CD, 100pF, ±10% |
| C303 | 24590104 | PF, 0.1μF |
| C304 | 24212472 | CD, 4700pF, ±10% |
| C306 | 24212391 | CD, 390pF, ±10% |
| C312 | 24590823 | PF, 0.082μF |

| Location No. | Part No. | Description |
|---|---|---|
| C313 | 24668101 | EL, 100μF, ±20%, 35V |
| C314 | 24214102 | CD, 1000pF, ±10%, 500V |
| C315 | 24214221 | CD, 220pF, ±10%, 500V |
| C317 | 24617915 | EL, 1μF, ±10%, 50V |
| C318 | 24630798 | EL, 3300μF, ±10%, 25kV |
| C323 | 24082049 | PF, 0.047μF, 100V |
| C325 | 24668221 | EL, 220μF, ±20%, 35V |
| C331 | 24668102 | EL, 1000μF, ±20%, 35V |
| C332 | 24082057 | PF, 0.22μF, 100V |
| C341 | 24666101 | EL, 100μF, ±20%, 16V |
| C403 | 24206010 | EL, 1μF, 50V |
| C406 | 24590472 | PF, 4700pF |
| C407 | 24590472 | PF, 4700pF |
| C408 | 24666331 | EL, 330μF, ±20%, 16V |
| C409 | 24232103 | CD, 0.01μF, +80%, -20% |
| C410 | 24082261 | PF, 5600pF, 100V |
| C411 | 24212101 | CD, 100pF, ±10% |
| C412 | 24214332 | CD, 3300pF, ±10%, 500V |
| C413 | 24590223 | PF, 0.022μF |
| C416 | 24214271 | CD, 270pF, ±10%, 500V |
| ⚠C440 | 24082343 | PF, 5600pF, ±3%, 1500V |
| C441 | 24214221 | CD, 220pF, ±10%, 500V |
| C442 | 24095754 | PF, 0.43μF, 200V |
| C443 | 24214221 | CD, 220pF, ±10%, 500V |
| ⚠C444 | 24082336 | PF, 3600pF, ±3%, 1500V |
| C445 | 24095903 | PF, 0.056μF, ±10%, 250V |
| C446 | 24666471 | EL, 470μF, ±20%, 16V |
| C447 | 24679479 | EL, 4.7μF, ±20%, 250V |
| C448 | 24640908 | EL, 33μF, ±20%, 160V |
| C449 | 24667102 | EL, 1000μF, ±20%, 25V |
| ⚠C463 | 24212222 | CD, 2200pF, ±10% |
| C470 | 24666220 | EL, 22μF, ±20%, 16V |
| C471 | 24538474 | PF, 0.47μF |
| C480 | 24538474 | PF, 0.47μF |
| C481 | 24666101 | EL, 100μF, ±20%, 16V |
| C482 | 24666101 | EL, 100μF, ±20%, 16V |
| C501 | 24590104 | PF, 0.1μF |
| C502 | 24232103 | CD, 0.01μF, +80%, -20% |
| C503 | 24794221 | EL, 220μF, ±20%, 16V |
| C504 | 24797478 | EL, 0.47μF, ±20%, 50V |
| C505 | 24794100 | EL, 10μF, ±20%, 16V |

| Location No. | Part No. | Description |
|---|---|---|
| C506 | 24473680 | CD, 68pF |
| C507 | 24473680 | CD, 68pF |
| C508 | 24473680 | CD, 68pF |
| C509 | 24797100 | EL, 10μF, ±20%, 50V |
| C511 | 24590104 | PF, 0.1μF |
| C512 | 24590104 | PF, 0.1μF |
| C513 | 24590104 | PF, 0.1μF |
| C514 | 24590472 | PF, 4700pF |
| C516 | 24212561 | CD, 560pF, ±10% |
| C517 | 24794470 | EL, 47μF, ±20%, 16V |
| C518 | 24590473 | PF, 0.047μF |
| C520 | 24590102 | PF, 1000pF |
| C521 | 24590102 | PF, 1000pF |
| C531 | 24212391 | CD, 390pF, ±10% |
| C532 | 24212391 | CD, 390pF, ±10% |
| C533 | 24212391 | CD, 390pF, ±10% |
| C534 | 24794471 | EL, 470μF, ±20%, 16V |
| C536 | 24797479 | EL, 4.7μF, ±20%, 50V |
| C601 | 24795471 | EL, 470μF, ±20%, 25V |
| C602 | 24590104 | PF, 0.1μF |
| C603 | 24795221 | EL, 220μF, ±20%, 25V |
| C604 | 24474221 | CD, 220pF, ±10% |
| C605 | 24206010 | EL, 1μF, 50V |
| C606 | 24795220 | EL, 22μF, ±20%, 25V |
| C607 | 24590682 | PF, 6800pF |
| C608 | 24797010 | EL, 1μF, ±20%, 50V |
| C609 | 24794470 | EL, 47μF, ±20%, 16V |
| C610 | 24206010 | EL, 1μF, 50V |
| C611 | 24212271 | CD, 270pF, ±10% |
| C612 | 24212102 | CD, 1000pF, ±10% |
| C613 | 24206010 | EL, 1μF, 50V |
| C616 | 24797100 | EL, 10μF, ±20%, 50V |
| C617 | 24206010 | EL, 1μF, 50V |
| C618 | 24797470 | EL, 47μF, ±20%, 50V |
| C619 | 24590332 | PF, 3300pF |
| C620 | 24797229 | EL, 2.2μF, ±20%, 50V |
| C622 | 24797010 | EL, 1μF, ±20%, 50V |
| C623 | 24232103 | CD, 0.01μF, +80%, −20% |
| C624 | 24232103 | CD, 0.01μF, +80%, −20% |
| ⚠ C801 | 24082363 | PF, 0.22μF, ±20%, AC250V |
| ⚠ C802 | 24094655 | CD, 1000pF, ±20%, AC400V |
| ⚠ C803 | 24094655 | CD, 1000pF, ±20%, AC400V |
| C807 | 24092281 | CD, 4700pF, ±20%, AC250V |
| C808 | 24092281 | CD, 4700pF, ±20%, AC250V |
| C809 | 24086871 | EL, 120μF, ±20%, 400V |
| C812 | 24092341 | CD, 470pF, ±10%, 2kV |
| C813 | 24095931 | PF, 2200pF, 1250V |
| C814 | 24590223 | PF, 0.022μF |
| C815 | 24590182 | PF, 1800pF |
| C816 | 24666470 | EL, 47μF, ±20%, 16V |
| C817 | 24676220 | EL, 22μF, ±20%, 100V |
| C820 | 24794470 | EL, 47μF, ±20%, 16V |
| C828 | 24212101 | CD, 100pF, ±10% |
| C829 | 24795471 | EL, 470μF, ±20%, 25V |
| C830 | 24092337 | CD, 220pF, ±10%, 2kV |
| C831 | 24086953 | EL, 220μF, ±20%, 160V |
| C835 | 24797479 | EL, 4.7μF, ±20%, 50V |
| C836 | 24797100 | EL, 10μF, ±20%, 50V |
| C837 | 24797100 | EL, 10μF, ±20%, 50V |
| C838 | 24538474 | PF, 0.47μF |
| C844 | 24094656 | CD, 2200pF, ±20%, AC400V |
| C849 | 24214471 | CD, 470pF, ±10%, 500V |
| C901 | 24700100 | EL, 10μF, ±20%, 250V |
| C902 | 24095931 | PF, 2200pF, 1250V |

| Location No. | Part No. | Description |
|---|---|---|
| C903 | 24212102 | CD, 1000pF, ±10% |
| CA01 | 24474101 | CD, 100pF, ±10% |
| CA14 | 24232103 | CD, 0.01μF, +80%, −20% |
| CA15 | 24794100 | EL, 10μF, ±20%, 16V |
| CA16 | 24232103 | CD, 0.01μF, +80%, −20% |
| CA18 | 24232103 | CD, 0.01μF, +80%, −20% |
| CA19 | 24794470 | EL, 47μF, ±20%, 16V |
| CA20 | 24474101 | CD, 100pF, ±10% |
| CA21 | 24435470 | CD, 47pF, 500V |
| CA22 | 24590104 | PF, 0.1μF |
| CA23 | 24590104 | PF, 0.1μF |
| CA24 | 24590104 | PF, 0.1μF |
| CA37 | 24590104 | PF, 0.1μF |
| CA39 | 24474391 | CD, 390pF, ±10% |
| CA40 | 24212221 | CD, 220pF, ±10% |
| CA42 | 24590104 | PF, 0.1μF |
| CA43 | 24590104 | PF, 0.1μF |
| CA44 | 24794470 | EL, 47μF, ±20%, 16V |
| CA45 | 24473560 | CD, 56pF |
| CA46 | 24473560 | CD, 56pF |
| CA47 | 24212103 | CD, 0.01μF, ±10% |
| CA48 | 24232103 | CD, 0.01μF, +80%, −20% |
| CA49 | 24475222 | CD, 2200pF, 16V |
| CA50 | 24797479 | EL, 4.7μF, ±20%, 50V |
| CA51 | 24474101 | CD, 100pF, ±10% |
| CN02 | 24794100 | EL, 10μF, ±20%, 16V |
| CN03 | 24794100 | EL, 10μF, ±20%, 16V |
| CV01 | 24794101 | EL, 100μF, ±20%, 16V |
| CV02 | 24793471 | EL, 470μF, ±20%, 10V |
| CV03 | 24232103 | CD, 0.01μF, +80%, −20% |
| CX08 | 24590104 | PF, 0.1μF |
| CX09 | 24590104 | PF, 0.1μF |
| CX10 | 24590104 | PF, 0.1μF |

## RESISTORS

| | | |
|---|---|---|
| R101 | 24366101 | CF, 100 ohm |
| R102 | 24366103 | CF, 10k ohm |
| R103 | 24366103 | CF, 10k ohm |
| R104 | 24366392 | CF, 3900 ohm |
| R105 | 24366103 | CF, 10k ohm |
| R135 | 24366682 | CF, 6800 ohm |
| R136 | 24366122 | CF, 1200 ohm |
| R137 | 24366681 | CF, 680 ohm |
| R138 | 24366360 | CF, 36 ohm |
| R140 | 24366104 | CF, 100k ohm |
| R141 | 24366122 | CF, 1200 ohm |
| R142 | 24366472 | CF, 4700 ohm |
| R143 | 24366122 | CF, 1200 ohm |
| R145 | 24366183 | CF, 18k ohm |
| R151 | 24066926 | VR, 10k ohm, 1/10W |
| R161 | 24366183 | CF, 18k ohm |
| R162 | 24366681 | CF, 680 ohm |
| R163 | 24366682 | CF, 6800 ohm |
| R173 | 24366271 | CF, 270 ohm |
| R174 | 24366392 | CF, 3900 ohm |
| R178 | 24366102 | CF, 1k ohm |
| R179 | 24366391 | CF, 390 ohm |
| R180 | 24366331 | CF, 330 ohm |
| R181 | 24366221 | CF, 220 ohm |
| R182 | 24366820 | CF, 82 ohm |
| R185 | 24366101 | CF, 100 ohm |
| R186 | 24366391 | CF, 390 ohm |
| R187 | 24366223 | CF, 22k ohm |
| R188 | 24366223 | CF, 22k ohm |

| Location No. | Part No. | Description |
|---|---|---|
| R189 | 24366102 | CF, 1k ohm |
| R191 | 24942226 | CC, 22M ohm, 1/2W |
| R201 | 24366511 | CF, 510 ohm |
| R203 | 24366473 | CF, 47k ohm |
| R205 | 24366274 | CF, 270k ohm |
| R206 | 24366103 | CF, 10k ohm |
| R207 | 24366103 | CF, 10k ohm |
| R211 | 24366153 | CF, 15k ohm |
| R212 | 24366183 | CF, 18k ohm |
| R213 | 24366911 | CF, 910 ohm |
| R215 | 24366621 | CF, 620 ohm |
| R217 | 24366103 | CF, 10k ohm |
| R240 | 24366183 | CF, 18k ohm |
| R241 | 24366123 | CF, 12k ohm |
| R252 | 24066597 | VR, 1k ohm, 1/10W |
| R253 | 24066597 | VR, 1k ohm, 1/10W |
| R299 | 24366683 | CF, 68k ohm |
| R301 | 24366155 | CF, 1.5M ohm |
| R302 | 24366564 | CF, 560k ohm |
| R304 | 24366102 | CF, 1k ohm |
| R311 | 24366101 | CF, 100 ohm |
| R316 | 24366102 | CF, 1k ohm |
| R317 | 24366563 | CF, 56k ohm |
| R318 | 24366393 | CF, 39k ohm |
| R319 | 24552272 | OMF, 2700 ohm, 1/2W |
| R320 | 24383271 | OMF, 270 ohm, 2W |
| R321 | 24366133 | CF, 13k ohm |
| R322 | 24366104 | CF, 100k ohm |
| R323 | 24322828 | OMF, 0.82 ohm, 1W |
| R325 | 24366113 | CF, 11k ohm |
| R326 | 24382470 | OMF, 47 ohm, 1W |
| ⚠R327 | 24339569 | MF, 5.6 ohm, 2W |
| R330 | 24321109 | MF, 1 ohm, 1/2W |
| R333 | 24366222 | CF, 2200 ohm |
| R340 | 24366473 | CF, 47k ohm |
| R341 | 24366182 | CF, 1800 ohm |
| R342 | 24366562 | CF, 5600 ohm |
| R343 | 24310159 | MF, 1.5 ohm, 1/2W |
| R344 | 24366392 | CF, 3900 ohm |
| R351 | 24066606 | VR, 1M ohm, 1/10W |
| R401 | 24366182 | CF, 1800 ohm |
| R403 | 24366153 | CF, 15k ohm |
| R407 | 24366222 | CF, 2200 ohm |
| R409 | 24366564 | CF, 560k ohm |
| R410 | 24552472 | OMF, 4700 ohm, 1/2W |
| R411 | 24366561 | CF, 560 ohm |
| R412 | 24366103 | CF, 10k ohm |
| R413 | 24366331 | CF, 330 ohm |
| R416 | 24510152 | Cement, 1500 ohm, 5W |
| R419 | 24366560 | CF, 56 ohm |
| R422 | 24366273 | CF, 27k ohm |
| R440 | 24366103 | CF, 10k ohm |
| R441 | 24366103 | CF, 10k ohm |
| R442 | 24009951 | OMF, 1k ohm, 1W |
| ⚠R444 | 24338398 | MF, 0.39 ohm, 1W |
| ⚠R448 | 24338338 | MF, 0.33 ohm, 1W |
| R451 | 24066600 | VR, 10k ohm, 1/10W |
| R470 | 24338568 | MF, 0.56 ohm, 1W |
| R471 | 24552101 | OMF, 100 ohm, 1/2W |
| R472 | 24376393 | CF, 39k ohm, 1/2W |
| R474 | 24366331 | CF, 330 ohm |
| R475 | 24366102 | CF, 1k ohm |
| R477 | 24366153 | CF, 15k ohm |
| R480 | 24546229 | FR, 2.2 ohm, 1/2W |

| Location No. | Part No. | Description |
|---|---|---|
| R501 | 24366332 | CF, 3300 ohm |
| R502 | 24366472 | CF, 4700 ohm |
| R503 | 24366221 | CF, 220 ohm |
| R504 | 24366221 | CF, 220 ohm |
| R505 | 24366221 | CF, 220 ohm |
| R506 | 24366183 | CF, 18k ohm |
| R509 | 24366433 | CF, 43k ohm |
| R512 | 24366104 | CF, 100k ohm |
| R513 | 24366473 | CF, 47k ohm |
| R514 | 24552221 | OMF, 220 ohm, 1/2W |
| R517 | 24366103 | CF, 10k ohm |
| R521 | 24366102 | CF, 1k ohm |
| R523 | 24366102 | CF, 1k ohm |
| R525 | 24366102 | CF, 1k ohm |
| R528 | 24366511 | CF, 510 ohm |
| R529 | 24366182 | CF, 1800 ohm |
| R530 | 24366472 | CF, 4700 ohm |
| R531 | 24366472 | CF, 4700 ohm |
| R532 | 24366561 | CF, 560 ohm |
| R533 | 24366471 | CF, 470 ohm |
| R534 | 24366471 | CF, 470 ohm |
| R535 | 24366471 | CF, 470 ohm |
| R536 | 24366122 | CF, 1200 ohm |
| R537 | 24366122 | CF, 1200 ohm |
| R538 | 24366122 | CF, 1200 ohm |
| R540 | 24366273 | CF, 27k ohm |
| R541 | 24366273 | CF, 27k ohm |
| R543 | 24366273 | CF, 27k ohm |
| R547 | 24552820 | OMF, 82 ohm, 1/2W |
| R548 | 24366101 | CF, 100 ohm |
| R551 | 24066600 | VR, 10k ohm, 1/10W |
| R557 | 24066600 | VR, 10k ohm, 1/10W |
| R558 | 24066600 | VR, 10k ohm, 1/10W |
| R559 | 24066600 | VR, 10k ohm, 1/10W |
| R561 | 24366390 | CF, 39 ohm |
| R562 | 24366390 | CF, 39 ohm |
| R563 | 24366390 | CF, 39 ohm |
| R564 | 24366361 | CF, 360 ohm |
| R565 | 24366361 | CF, 360 ohm |
| R574 | 24366153 | CF, 15k ohm |
| R575 | 24366103 | CF, 10k ohm |
| R580 | 24366103 | CF, 10k ohm |
| R581 | 24366102 | CF, 1k ohm |
| R591 | 24382183 | OMF, 18k ohm, 1W |
| R592 | 24382183 | OMF, 18k ohm, 1W |
| R593 | 24382183 | OMF, 18k ohm, 1W |
| R601 | 24366339 | CF, 3.3 ohm |
| R602 | 24366123 | CF, 12k ohm |
| R603 | 24366182 | CF, 1800 ohm |
| R604 | 24366103 | CF, 10k ohm |
| R605 | 24552331 | OMF, 330 ohm, 1/2W |
| R607 | 24366103 | CF, 10k ohm |
| R614 | 24366562 | CF, 5600 ohm |
| R615 | 24366562 | CF, 5600 ohm |
| R616 | 24366562 | CF, 5600 ohm |
| R618 | 24366273 | CF, 27k ohm |
| R621 | 24366222 | CF, 2200 ohm |
| R622 | 24366682 | CF, 6800 ohm |
| R623 | 24366682 | CF, 6800 ohm |
| R624 | 24366681 | CF, 680 ohm |
| R625 | 24366104 | CF, 100k ohm |
| R626 | 24366103 | CF, 10k ohm |
| R627 | 24366153 | CF, 15k ohm |
| R628 | 24366104 | CF, 100k ohm |

| Location No. | Part No. | Description |
|---|---|---|
| R629 | 24366153 | CF, 15k ohm |
| R630 | 24366392 | CF, 3900 ohm |
| R633 | 24366153 | CF, 15k ohm |
| R638 | 24366102 | CF, 1k ohm |
| R639 | 24366683 | CF, 68k ohm |
| R641 | 24366103 | CF, 10k ohm |
| R642 | 24366153 | CF, 15k ohm |
| R644 | 24366332 | CF, 3300 ohm |
| R645 | 24366204 | CF, 200k ohm |
| ⚠ R801 | 24009954 | Metal-Glazed Resistor, 2.2M ohm, 1/2W |
| R803 | 24366155 | CF, 1.5M ohm |
| R804 | 24366561 | CF, 560 ohm |
| R805 | 24377394 | CF, 390k ohm, 1W |
| R806 | 24383470 | OMF, 47 ohm, 2W |
| R807 | 24383330 | OMF, 33 ohm, 2W |
| R808 | 24531100 | FR, 10 ohm, 1/2W |
| R809 | 24366561 | CF, 560 ohm |
| R810 | 24366561 | CF, 560 ohm |
| R811 | 24322278 | MF, 0.27 ohm, 1W |
| R812 | 24366470 | CF, 47 ohm |
| R813 | 24366561 | CF, 560 ohm |
| R814 | 24366102 | CF, 1k ohm |
| R815 | 24366561 | CF, 560 ohm |
| R816 | 24366103 | CF, 10k ohm |
| R817 | 24366102 | CF, 1k ohm |
| R818 | 24366102 | CF, 1k ohm |
| R819 | 24321569 | MF, 5.6 ohm, 1/2W |
| R820 | 24366561 | CF, 560 ohm |
| R825 | 24366472 | CF, 4700 ohm |
| R828 | 24366339 | CF, 3.3 ohm |
| R830 | 24310159 | MF, 1.5 ohm, 1/2W |
| R842 | 24366681 | CF, 680 ohm |
| R843 | 24366821 | CF, 820 ohm |
| ⚠ R844 | 24005007 | Metal-Glazed Resistor, 8.2M ohm, 1W |
| R848 | 24366392 | CF, 3900 ohm |
| R860 | 24366561 | CF, 560 ohm |
| R864 | 24382560 | OMF, 56 ohm, 1W |
| R865 | 24366681 | CF, 680 ohm |
| R866 | 24366471 | CF, 470 ohm |
| R867 | 24366103 | CF, 10k ohm |
| R868 | 24366472 | CF, 4700 ohm |
| R870 | 24383103 | OMF, 10k ohm, 2W |
| R871 | 24366472 | CF, 4700 ohm |
| R872 | 24510479 | Cement, 4.7 ohm, 5W |
| R878 | 24531270 | FR, 27 ohm, 1/2W |
| R879 | 24366472 | CF, 4700 ohm |
| R884 | 24531120 | FR, 12 ohm, 1/2W |
| ⚠ R890 | 24019340 | PTC Thermistor, 18 ohm, 290V |
| R893 | 24366103 | CF, 10k ohm |
| R901 | 24552272 | OMF, 2700 ohm, 1/2W |
| R902 | 24552272 | OMF, 2700 ohm, 1/2W |
| R903 | 24552272 | OMF, 2700 ohm, 1/2W |
| ⚠ R920 | 24000940 | FR, 2 ohm, 2W |
| RA01 | 24366103 | CF, 10k ohm |
| RA02 | 24366103 | CF, 10k ohm |
| RA03 | 24366103 | CF, 10k ohm |
| RA05 | 24366103 | CF, 10k ohm |
| RA06 | 24366103 | CF, 10k ohm |
| RA07 | 24366472 | CF, 4700 ohm |
| RA09 | 24019001 | MF, 100k ohm, ±1%, 1/4W |
| RA17 | 24366471 | CF, 470 ohm |

| Location No. | Part No. | Description |
|---|---|---|
| RA21 | 24366683 | CF, 68k ohm |
| RA24 | 24366225 | CF, 2.2M ohm |
| RA25 | 24366333 | CF, 33k ohm |
| RA27 | 24366333 | CF, 33k ohm |
| RA28 | 24000372 | MF, 3900 ohm, ±1%, 1/4W |
| RA33 | 24366221 | CF, 220 ohm |
| RA34 | 24000635 | MF, 12k ohm, ±1%, 1/4W |
| RA35 | 24366223 | CF, 22k ohm |
| RA36 | 24366102 | CF, 1k ohm |
| RA37 | 24366273 | CF, 27k ohm |
| RA40 | 24366102 | CF, 1k ohm |
| RA41 | 24366103 | CF, 10k ohm |
| RA42 | 24366103 | CF, 10k ohm |
| RA45 | 24366103 | CF, 10k ohm |
| RA49 | 24366103 | CF, 10k ohm |
| RA54 | 24366472 | CF, 4700 ohm |
| RA55 | 24366471 | CF, 470 ohm |
| RA57 | 24366103 | CF, 10k ohm |
| RA58 | 24366222 | CF, 2200 ohm |
| RA60 | 24366331 | CF, 330 ohm |
| RA61 | 24366103 | CF, 10k ohm |
| RA64 | 24366103 | CF, 10k ohm |
| RA65 | 24366103 | CF, 10k ohm |
| RA66 | 24366104 | CF, 100k ohm |
| RA70 | 24366332 | CF, 3300 ohm |
| RA71 | 24366682 | CF, 6800 ohm |
| RA72 | 24366203 | CF, 20k ohm |
| RA76 | 24366103 | CF, 10k ohm |
| RA78 | 24366102 | CF, 1k ohm |
| RA81 | 24366471 | CF, 470 ohm |
| RA86 | 24366103 | CF, 10k ohm |
| RA88 | 24366103 | CF, 10k ohm |
| RA90 | 24366103 | CF, 10k ohm |
| RA91 | 24366102 | CF, 1k ohm |
| RA92 | 24366473 | CF, 47k ohm |
| RA96 | 24366123 | CF, 12k ohm |
| RA97 | 24366152 | CF, 1500 ohm |
| RA98 | 24366154 | CF, 150k ohm |
| RA99 | 24366564 | CF, 560k ohm |
| RE01 | 24366391 | CF, 390 ohm |
| RN01 | 24366101 | CF, 100 ohm |
| RN05 | 24366564 | CF, 560k ohm |
| RN07 | 24366223 | CF, 22k ohm |
| RV01 | 24366151 | CF, 150 ohm |
| RV02 | 24382101 | OMF, 100 ohm, 1W |
| RV03 | 24552101 | OMF, 100 ohm, 1/2W |
| RV04 | 24366680 | CF, 68 ohm |
| RV05 | 24366103 | CF, 10k ohm |
| RV06 | 24366102 | CF, 1k ohm |
| RV08 | 24366560 | CF, 56 ohm |
| RV09 | 24366102 | CF, 1k ohm |
| RV10 | 24366750 | CF, 75 ohm |
| RV11 | 24366102 | CF, 1k ohm |
| RV12 | 24366750 | CF, 75 ohm |
| RV13 | 24366102 | CF, 1k ohm |
| RV14 | 24366750 | CF, 75 ohm |
| RV15 | 24366750 | CF, 75 ohm |
| RV16 | 24366682 | CF, 6800 ohm |
| RV17 | 24366102 | CF, 1k ohm |
| RV19 | 24366183 | CF, 18k ohm |
| RV22 | 24366182 | CF, 1800 ohm |
| RV23 | 24366102 | CF, 1k ohm |
| RV24 | 24366621 | CF, 620 ohm |
| RV25 | 24366621 | CF, 620 ohm |

| Location No. | Part No. | Description |
|---|---|---|
| RV26 | 24366101 | CF, 100 ohm |
| RV27 | 24366101 | CF, 100 ohm |
| RV28 | 24366101 | CF, 100 ohm |
| RV29 | 24366681 | CF, 680 ohm |
| RV30 | 24366681 | CF, 680 ohm |
| RX08 | 24366391 | CF, 390 ohm |
| RX09 | 24366391 | CF, 390 ohm |
| RX10 | 24366391 | CF, 390 ohm |
| **COILS & TRANSFORMERS** | | |
| L101 | 23238559 | Coil, Peaking, TRF4R56AJ |
| L102 | 23221803 | Coil, Choke, TLN3040D |
| L105 | 23261986 | Coil, RF Choke, TRF9220 |
| L107 | 23238713 | Coil, Peaking, TRF4120AJ |
| L108 | 23238714 | Coil, Peaking, TRF4100AJ |
| L311 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| L408 | 23221722 | Coil, Choke, TLN3142D |
| L410 | 23289100 | Coil, Peaking, TRF4100AF |
| L441 | 23233070 | Coil, Linearity, TLN2111G |
| ⚠L462 | ---------- | DY, Supplied with V901 |
| L590 | 23289100 | Coil, Peaking, TRF4100AF |
| L811 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| L821 | 23222694 | Coil, Width, TLN2026 |
| L823 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| L826 | 23222694 | Coil, Width, TLN2026 |
| L829 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| L866 | 23289229 | Coil, Peaking, TRF42R2AF |
| ⚠L901 | 23200205 | Coil, Degaussing, TSB-2333AR |
| LA02 | 23289109 | Coil, Peaking, TRF41R0AF |
| LA03 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| LA04 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| LA05 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| LV01 | 23238714 | Coil, Peaking, TRF4100AJ |
| T103 | 23262813 | Coil, IF, TRF1077D |
| ⚠T401 | 23224983 | Transformer, Horiz. Drive, TLN1039 |
| ⚠T461 | 23236464 | Transformer, Flyback, TFB4123AR |
| ⚠T801 | 23211644 | Line Filter, TRF3118G |
| ⚠T803 | 23217240 | Transformer, Converter, TPW3301AR |
| **SEMICONDUCTORS** | | |
| Q101 | 23119441 | IC, LA7910 |
| Q105 | A6708871 | Transistor, 2SC388ATM |
| Q106 | 23114528 | Transistor, 2SC1740S-Q |
| Q110 | 23114528 | Transistor, 2SC1740S-Q |
| Q111 | 23114528 | Transistor, 2SC1740S-Q |
| Q112 | 23114530 | Transistor, 2SA933S-Q |
| Q301 | B0377890 | IC, TA8403K |
| Q340 | 23114530 | Transistor, 2SA933S-Q |
| Q402 | A6330069 | Transistor, 2SC2482 FA-1 |
| ⚠Q404 | 23314375 | Transistor, ON4409(508D) |
| Q470 | A6547250 | Transistor, 2SA1320 |
| Q480 | 23904844 | IC, MCT7809BT |
| Q501 | 23904605 | IC, TDA8361 |
| Q502 | 23904607 | IC, TDA4662 |
| Q504 | 23114530 | Transistor, 2SA933S-Q |
| Q505 | A6330069 | Transistor, 2SC2482 FA-1 |
| Q506 | 23114530 | Transistor, 2SA933S-Q |
| Q507 | A6330069 | Transistor, 2SC2482 FA-1 |
| Q508 | 23114530 | Transistor, 2SA933S-Q |
| Q509 | A6330069 | Transistor, 2SC2482 FA-1 |
| Q510 | A6330069 | Transistor, 2SC2482 FA-1 |

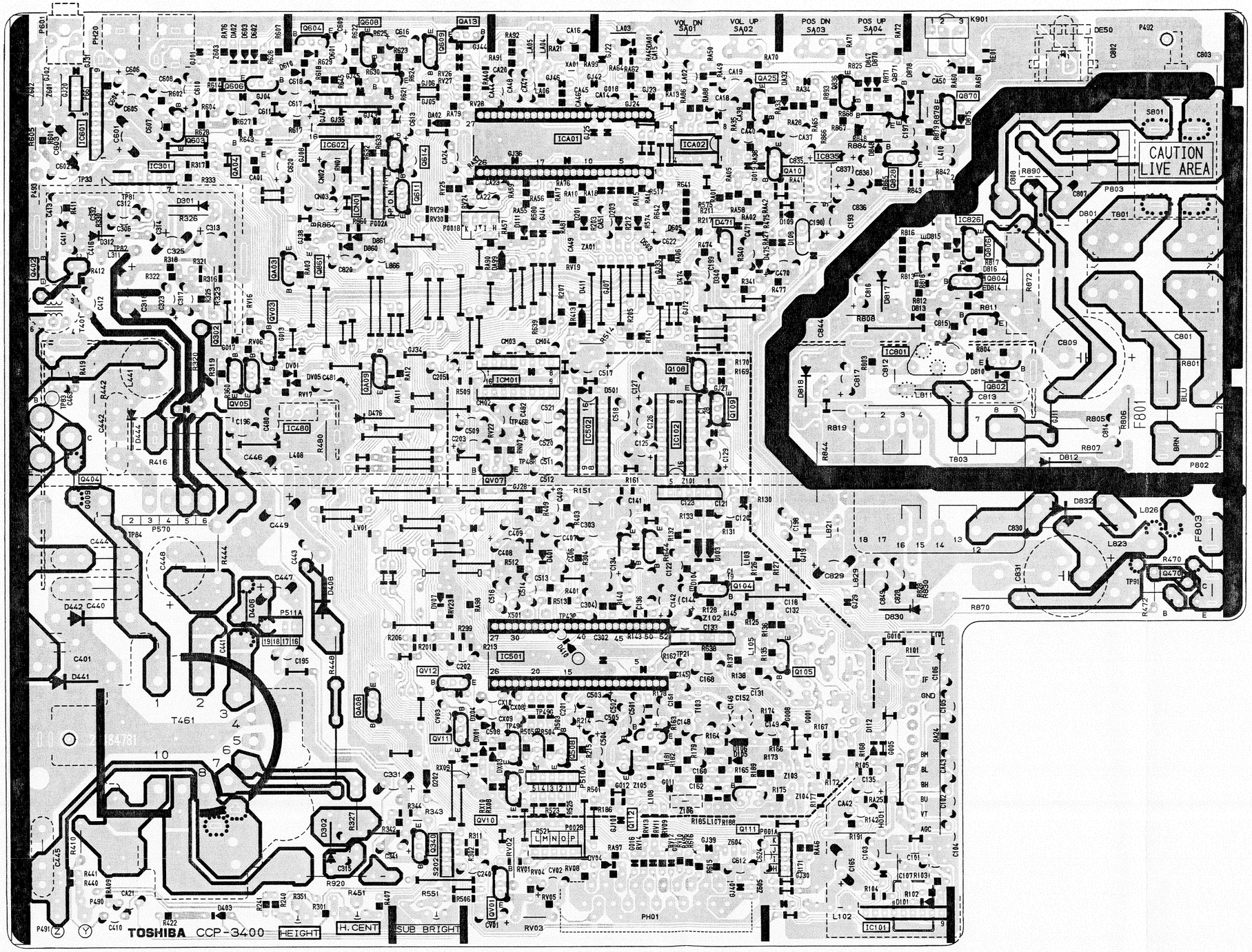
| Location No. | Part No. | Description |
|---|---|---|
| Q511 | 23114530 | Transistor, 2SA933S-Q |
| Q601 | 23119668 | IC, TDA2611A |
| Q602 | 23318916 | IC, MC14053BCP |
| Q603 | A6342206 | Transistor, 2SC2878-A(TE |
| Q604 | 23114530 | Transistor, 2SA933S-Q |
| Q606 | A6010040 | Transistor, RN2004 |
| Q607 | 23114528 | Transistor, 2SC1740S-Q |
| Q608 | 23114528 | Transistor, 2SC1740S-Q |
| Q609 | A6342206 | Transistor, 2SC2878-A(TE |
| Q613 | 23114528 | Transistor, 2SC1740S-Q |
| Q801 | 23314146 | IC(STR), STR58041 |
| Q802 | A6534145 | Transistor, 2SA1020-Y(C) |
| Q803 | A6333346 | Transistor, 2SC2655-Y(C) |
| Q804 | 23114528 | Transistor, 2SC1740S-Q |
| Q805 | 23114528 | Transistor, 2SC1740S-Q |
| Q806 | 23114528 | Transistor, 2SC1740S-Q |
| ⚠Q826 | A8645166 | Photo Coupler, TLP721F(D4-G |
| Q828 | 23114528 | Transistor, 2SC1740S-Q |
| Q831 | 23114528 | Transistor, 2SC1740S-Q |
| ⚠Q835 | 23318299 | IC, L78MR05 |
| Q836 | 23114530 | Transistor, 2SA933S-Q |
| Q861 | A6333346 | Transistor, 2SC2655-Y(C) |
| Q870 | A6333346 | Transistor, 2SC2655-Y(C) |
| Q871 | 23114528 | Transistor, 2SC1740S-Q |
| QA01 | 23905376 | IC, SAA5290ZP1032 |
| QA02 | 23904706 | IC, NM24C02EN |
| QA03 | 23114528 | Transistor, 2SC1740S-Q |
| QA04 | 23114528 | Transistor, 2SC1740S-Q |
| QA08 | 23114528 | Transistor, 2SC1740S-Q |
| QA10 | 23114528 | Transistor, 2SC1740S-Q |
| QA25 | 23114528 | Transistor, 2SC1740S-Q |
| QN01 | 23319504 | IC, MM1031XS |
| QV01 | 23114528 | Transistor, 2SC1740S-Q |
| QV03 | 23114530 | Transistor, 2SA933S-Q |
| QV05 | 23114528 | Transistor, 2SC1740S-Q |
| QV07 | A6002030 | Transistor, RN1203 |
| QV10 | 23114528 | Transistor, 2SC1740S-Q |
| QV11 | 23114528 | Transistor, 2SC1740S-Q |
| QV12 | 23114528 | Transistor, 2SC1740S-Q |
| D101 | 23115599 | Diode, 1N4148 |
| D108 | 23115878 | Diode, Zener, μPC574J, (L) |
| D109 | 23115599 | Diode, 1N4148 |
| D111 | 23115599 | Diode, 1N4148 |
| D201 | 23115599 | Diode, 1N4148 |
| D202 | A7150041 | Diode, 1SS104 |
| D203 | 23115599 | Diode, 1N4148 |
| D301 | 23118479 | Diode, BYD33J |
| D302 | 23118479 | Diode, BYD33J |
| D312 | 23316794 | Diode, SC570A |
| D340 | 23316658 | Diode, Zener, MTZJ3.6A |
| D401 | 23316792 | Diode, SC215 |
| D403 | 23316688 | Diode, Zener, MTZJ9.1C |
| D406 | 23118479 | Diode, BYD33J |
| D408 | 23118052 | Diode, RU4Z |
| D410 | 23316687 | Diode, Zener, MTZJ9.1B |
| D411 | 23115599 | Diode, 1N4148 |
| D441 | 23118338 | Diode, RU4AM |
| D442 | 23316254 | Diode, ERC06-15 |
| D444 | 23118479 | Diode, BYD33J |
| D471 | A7801205 | SCR, SF0R3G42 |
| D474 | 23316728 | Diode, Zener, MTZJ16B |
| D475 | 23316719 | Diode, Zener, MTZJ12B |
| D476 | 23118479 | Diode, BYD33J |
| D501 | 23316669 | Diode, Zener, MTZJ5.1B |

| Location No. | Part No. | Description |
|---|---|---|
| D503 | 23115599 | Diode, 1N4148 |
| D591 | 23316554 | Diode, 1SS146 |
| D592 | 23316554 | Diode, 1SS146 |
| D593 | 23316554 | Diode, 1SS146 |
| D594 | 23115599 | Diode, 1N4148 |
| D601 | 23115599 | Diode, 1N4148 |
| D602 | 23115599 | Diode, 1N4148 |
| D603 | 23115599 | Diode, 1N4148 |
| D605 | 23115599 | Diode, 1N4148 |
| D610 | 23115599 | Diode, 1N4148 |
| D801 | 23118124 | Diode, LB-156 (LF-B) |
| D810 | 23316725 | Diode, Zener, MTZJ15B |
| D811 | 23115599 | Diode, 1N4148 |
| D812 | 23118479 | Diode, BYD33J |
| D813 | 23115599 | Diode, 1N4148 |
| D814 | 23316672 | Diode, Zener, MTZJ5.6B |
| D815 | 23115599 | Diode, 1N4148 |
| D816 | 23316648 | Diode, Zener, MTZJ2.2A |
| D817 | 23118479 | Diode, BYD33J |
| D818 | 23118479 | Diode, BYD33J |
| D819 | 23316675 | Diode, Zener, MTZJ6.2B |
| D830 | 23118479 | Diode, BYD33J |
| D832 | 23118451 | Diode, RU-4A |
| D847 | 23115599 | Diode, 1N4148 |
| D848 | 23316666 | Diode, Zener, MTZJ4.7B |
| D860 | 23316674 | Diode, Zener, MTZJ6.2A |
| D861 | 23316669 | Diode, Zener, MTZJ5.1B |
| D870 | 23115599 | Diode, 1N4148 |
| D875 | 23115599 | Diode, 1N4148 |
| D878 | 23316689 | Diode, Zener, MTZJ10A |
| DA01 | 23316675 | Diode, Zener, MTZJ6.2B |
| DA02 | 23115599 | Diode, 1N4148 |
| DA03 | 23115599 | Diode, 1N4148 |
| DA32 | 23115599 | Diode, 1N4148 |
| DA99 | 23115599 | Diode, 1N4148 |
| DE50 | 23358504 | LED, Red, SCL003URC3FX |
| DV01 | 23115599 | Diode, 1N4148 |
| DV04 | 23115599 | Diode, 1N4148 |
| DV05 | 23316666 | Diode, Zener, MTZJ4.7B |
| DV07 | 23316669 | Diode, Zener, MTZJ5.1B |
| DX01 | 23115599 | Diode, 1N4148 |
| DX03 | 23115599 | Diode, 1N4148 |
| DX04 | 23115599 | Diode, 1N4148 |
| **MISCELLANEOUS** | | |
| B202 | 23451651 | Holder, FBT |
| ⚠F801 | 23144473 | Fuse, 5.0A |
| F801A | 23165433 | Holder, Fuse |
| ⚠F803 | 23144875 | Fuse, 0.63A |
| F803A | 23165433 | Holder, Fuse |
| G009 | 23103859 | Coil (Ferrite Bead), TEM2011 |
| G010 | 24366680 | CF, 68 ohm |
| G012 | 24366390 | CF, 39 ohm |
| P601 | 23365292 | Jack, Earphone |
| ⚠P801 | 23372014 | Power Cord |
| PH01 | 23365598 | Connector, 21Pin |
| PH20 | 23364692 | Jack, Phono, 2P |
| S202 | 23344333 | Switch, Lever, 1C3P |
| ⚠S801 | 23145434 | Switch, Power, 2C2P |
| SA01 | 23145430 | Switch, Push, 1C1P |
| SA02 | 23145430 | Switch, Push, 1C1P |
| SA03 | 23145430 | Switch, Push, 1C1P |
| SA04 | 23145430 | Switch, Push, 1C1P |
| ⚠V901A | 23902067 | Socket, CRT, 10P |

| Location No. | Part No. | Description |
|---|---|---|
| W661 | 23351079 | Speaker, SPK-1351, 77x77mm, 16 ohm |
| X501 | 23153360 | Crystal, 4.43MHz |
| Z102 | 23303134 | Filter, 38.9M, OFWG1962M |
| Z103 | 23107855 | Ceramic Filter, 5.5MHz, TCF1031 |
| Z105 | 23107927 | Ceramic Video Trap, 5.5MHz, TCF1011 |
| Z601 | 23107744 | Filter, TEM1012 |
| Z602 | 23107744 | Filter, TEM1012 |
| Z603 | 23107744 | Filter, TEM1012 |
| Z604 | 23107744 | Filter, TEM1012 |
| Z605 | 23107744 | Filter, TEM1012 |
| ZA01 | 24094645 | Capacitor Block, 0.01μFx4, 50V |
| **PC BOARD ASSEMBLIES** | | |
| * U902A | 23704923 | Main Board, PB5860D1 |
| * U902B | 23704924 | CRT Drive Board, PB5860D2 |
| **PICTURE TUBE** | | |
| ⚠V901 | 23312670 | Picture Tube, A51EAL155X01 |
| **TUNER** | | |
| H001 | 23321209 | Tuner, EGA13 |
| **ACCESSORIES** | | |
| K902 | 23306084 | Remote Hand Unit, CT-9784 |
| AT03 | 23305743 | Battery Cover |
| Y101 | 23562564 | Owner's Manual, English, 2150TN |
| Y102 | 23562565 | Owner's Manual, Spanish, 2150TN |
| Y103 | 23562566 | Owner's Manual, Danish, 2150TN |
| Y104 | 23562567 | Owner's Manual, Swedish, 2150TN |
| Y105 | 23562568 | Owner's Manual, Finnish, 2150TN |
| Y106 | 23562569 | Owner's Manual, Norwegian, 2150TN |

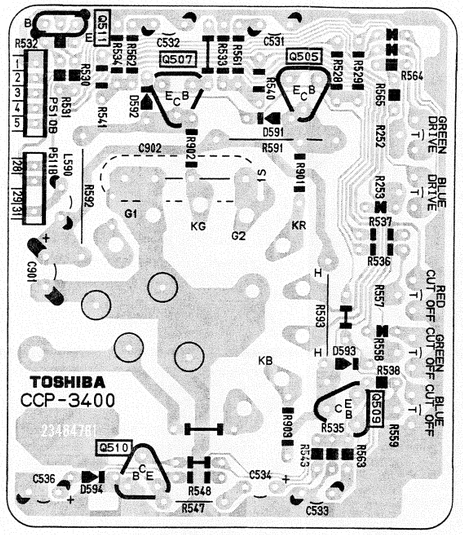
# MAIN BOARD PB5860D1

**BOTTOM (FOIL) SIDE**



# CRT DRIVE BOARD PB5860D2

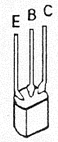
**BOTTOM (FOIL) SIDE**



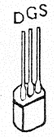



# TERMINAL VIEW OF TRANSISTORS

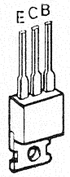
① BC327
BC337
BC547A
BC547B
BC547C
BC557A
BC557B
BC556A



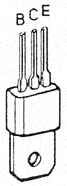

② 2SK30ATM
2SK117



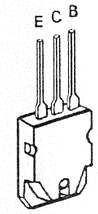

③ BD202



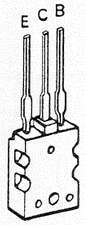

④ BF871
2SD553
2SC1569



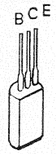

⑤ 2SC3678
2SC3182N



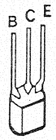

⑥ 2SD1427
2SD1432



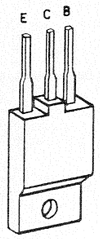

⑦ 2SC2482
2SA1321
2SC2230
2SA1020
2SC2655
2SC752GTM



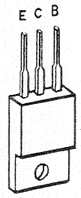

⑧ 2SC388ATM
2SA1015
2SC1959
2SA562TM



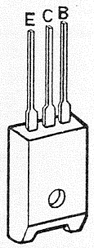

⑨ 2SD1548




⑩ 2SC2023




⑪ ON4409



# SCHEMATIC DIAGRAM MODEL: 2150TN

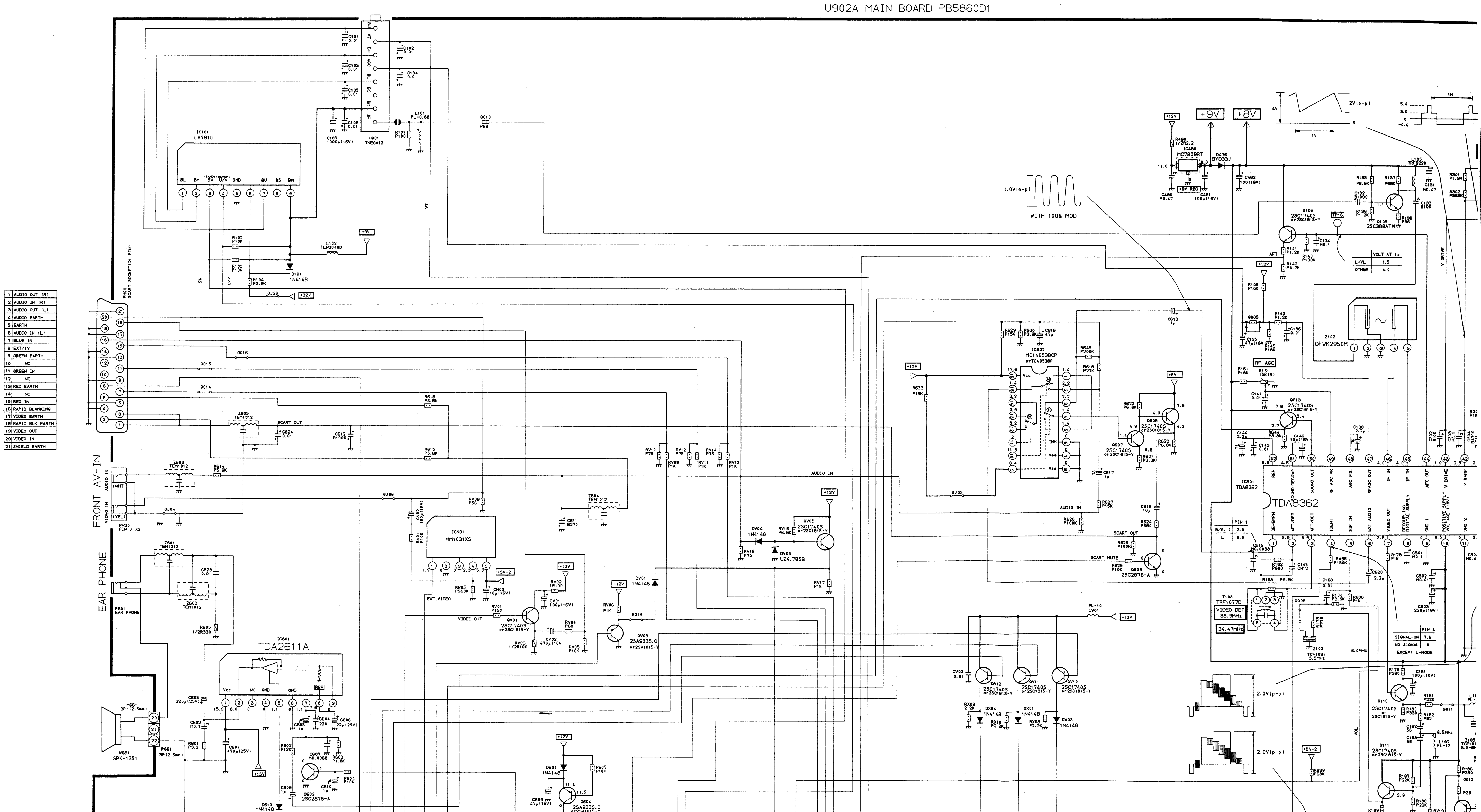
**CAUTION:** The international hazard symbols "⚠" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

**OBSERVATION OF VOLTAGES AND WAVEFORMS**

1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal. Voltages reading may vary ±20%.
2. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
3. Waveforms are taken using a standard colour bar signal.
4. Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.

**NOTES:**

1. D.C. resistance valu gram. These are me
2. The circuits are subj
3. ⊖ : Solder links.



EAR PHONE
PS01 EAR PHONE
ZS02 TEH1012
C623 0.01
R605 1/2R330
IC601 TDA2611A
M661 3P-12.5mm
V661 SPK-1351
P661 3P12.5mm
C623 220µ/25V
C602 M0.1
C601 470µ/25V
R601 P3.3
C605 1µ
C604 220
C606 22µ/25V
R602 P120
C607 M0.0068
R603 P1.8K
C608 1µ
C610 1µ
R604 P10K
Q602 2SC2878-A
D610 1N4148
+12V
+5V-2
EXT. VIDEO
RN05 PS68K
RV01 P150
VIDEO OUT
QV01 2SC17405 or2SC1815-Y
RV03 1/2R105
RV02 1R105
CV01 150µ/16V
RV04 P68
CV02 470µ/10V
RV05 P10K
D013 1N4148
RV06 P1K
DV01 1N4148
QV03 2SA933S.Q or2SA1015-Y
U24.7858
RV17 P1K
PL-10 LV01
CV03 0.01
QV12 2SC17405 or2SC1815-Y
QV11 2SC17405 or2SC1815-Y
QV10 2SC17405 or2SC1815-Y
DX04 1N4148
DX01 1N4148
DX03 1N4148
RX09 2.2K
RX10 P2.2K
RX08 P2.2K
2.0Vp-p
2.0Vp-p
+5V-2
R639 P68K
T103 TRF1077D
VIDEO DET 38.9MHz
34.47MHz
Q008
C152 56
C145 CH12
C168 0.01
R163 P6.8K
R162 P680
R176 P3.9K
R536 P1K
C620 2.2µ
C502 M0.01
C503 220µ/16V
PIN 4
S1GNAL-ON 7.6
NO S1GNAL 0
EXCEPT L-MODE
Z103 TCF1031 5.5MHz
6.0MHz
R179 P390
C161 100µ/10V
Q010 2SC17405 or2SC1815-Y
R180 P330
R181 P220
R182 P82
Q011
C162 56
C163 56
6.5MHz
L107 PL-12
Z105 TCF101 5.5-6M
Q111 2SC17405 or2SC1815-Y
R187 P22K
R188 P22K
R189 P1K
3.9
R186 P390
Q012
P39
2SA
or2
VOL
D111 1N4148
AFT
R191 1/2522M
VT
C449 2200
DA99 1N4148
+5V-1
D108 µPC574JL
+32V
C193 2.2µ
C190 0.01
RA34 1/4R12K
DA32 1N4148
C440 220
C439 B390
RA33 P220
RA28 1/4R3.9K
RA27 P33K
RA25 P33K
RA24 P2.2M
C437 M0.1
C442 M0.1
C443 M0.1
RA58 P2K2
RA36 P1K
Q025 2SC17405 or2SC1815-Y
RA66 P100K
D109 1N4148
128µsec
RA21 P68K
RA99 P560K
RA42 P10K
RA41 P10K
Q010 2SC17405 or2SC1815-Y
5V
0V
0.25µsec
3.5V
1.5V
EXT. VIDEO
INT. VIDEO
D601 1N4148
R667 P10K
11.4
11.5
C609 47µ/16V
Q604 2SA933S.Q or2SA1015-Y
D603 1N4148
D602 1N4148
Q606 RN2904
DA02 1N4148
EXT.MUTE
RA76 P10K
RA78 P1K
DA03 1N4148
0.7V
-4.0V
63.5µsec
RA06 P10K
RA51 P10K
RA02 P10K
RA65 P10K
QA03 2SC17405 or2SC1815-Y
QA04 2SC17405 or2SC1815-Y
RA03 P10K
RA07 P4.7K
CA01 B100
HD
VD
VOL
CONT
BRT
COL
D203 1N4148
R212 P18K
D201 1N4148
R203 P47K
D503 1N4148
R574 P15K
D505 1N4148
R542 P15K
Z401 0.01 X4
(BLOCK CAP)
CE22 1µ
R509 P43K
+5V-1
+32V
AFT
+5V-2
RV30 PS80
RV29 PS80
RV24 P620
RV25 P620
TV VIDEO
ICA01 SAA5290
SHIELD
FL/AFT
DATA(MEMORY) SDA
CLOCK(MEMORY) SCL
AM/FM
RMT
IDENT
VDDM
RESET
XTAL OUT
XTAL IN
OSC GND
VDDT
VDDA
V.BLK. IN
H.BLK. IN
VDS
R OUT
G OUT
B OUT
RGB REF
COR
VSSD2
FRAME
VT
VOLUME
MUTE
COLOUR
CONTRAST
Y-MUTE
BRIGHT
SYSTEM
AFC
21PIN
KEY
VIDEO/TV(OD)
VSSD
BAND 1
EXT-MUTE
BG/I OR
BG/IDK
POWER
BAND 2
GND
CVBS0
CVBS1
BLACK
IREF
VSSA
U/V
RA92 PL7N
RA91 P1K
RA45 P10K
DA20 B100
RA96 P12K
RA90 P10K
RA97 P1.5K
QA08 2SC17405 or2SC1815-Y
RA86 P10K
RA88 P10K
CA18 0.01
CA19 0.01
4.7µ/16V
IC402 NM24C02EN
DATA
CLOCK
GND
Vcc
CA16 0.01
CA66 56P
CA65 56P
XA01 12M
LA04 TEH2011
LA05 TEH2011
CA47 0.01
CA48 0.01
LA03 TEH2011
LA02 PL-1
DA01 UZ6.2B5B
CA14 0.01
RA64 P10K
RA40 P1K
C444 47µ
RV26 P39
RV27 P39
RV28 P39
RA72 P20K
RA71 P6.8K
RA70 P3.3K
RA60 P330
RA61 P10K
CA50 4.7µ
RE01 P390
SA04 SA03 SA02 SA01
PUSH SW
POS UP
POS DN
VOL UP
VOL DN
K901 IR-9109A-K
GND Vcc Vout
DE50 STAND BY (RED) SCL003URC3FX
RA49 P15K
CA51 100P
RA54 P4.7K
RA61 P39470
RA53 P10K
RA17 P470
RA57 P10K
RA65 P10K
RA55 P470
CA22 0.1
CA23 0.1
CA24 0.1
RA37 P27K
5V
0V
0.7V
0V
C808 470/1(AC250V)
C807 470/1(AC250V)
DB01 LB-156 LF-8
R872 5W4.7
C809 120µ(400V)
C802 .1002(AC400V)
C803 1000(AC400V)
R803 P1.5M
S801 POWER SW.
T801 TRF5139
CB01 TD.221AC250V1 S/N.240823638
R801 1/2R2.2M(HIGH-OHM)
CAUTION LIVE AREA
F801 T5.0A 250V
RB96 PTC180HM
P802 2P(black)
P803 2P(WHITE)
L901 T5B-2333AR DEGAUSING COIL
BROWN
BLUE
P801 AC CORD(2P) AC 220-240V (LIMIT VOLTAGE) 50/60Hz
IC801 STR58041
450V 600V
-41.0 0.2 -35.2
LB11 TEH2011
Q802 2SA1020-Y(C) 2SC2655-Y(C)
D812 BYD33J
R806 2R47
R807 2R33
R808 1/2PR15
D813 1N4148
D810 BYD33J
R819 1/2R5.6
R810 P560
R809 P560
D811 1N4148
C814 M0.022
B1800
C817 22µ/10V
R844 1R8.2M
C844 2200
-41.8
Q804 2SC17405 or2SC1815-Y
Q805 2SC17405 or2SC1815-Y
Q806 2SC17405 or2SC1815-Y
R814 P1K
R815 P560
R816 P10K
R818 P1K
D815 1N4148
D816 UZ2.2B5A
C816 47µ/16V
R812 P47.0.3
R813 P560
D814 UZ5.6B5B
D819 UZ5.2B5B
RB11 1R0.2T
T803 SMT4 102367/90
PRIMARY CIRCUIT
SECONDARY CIRCUIT

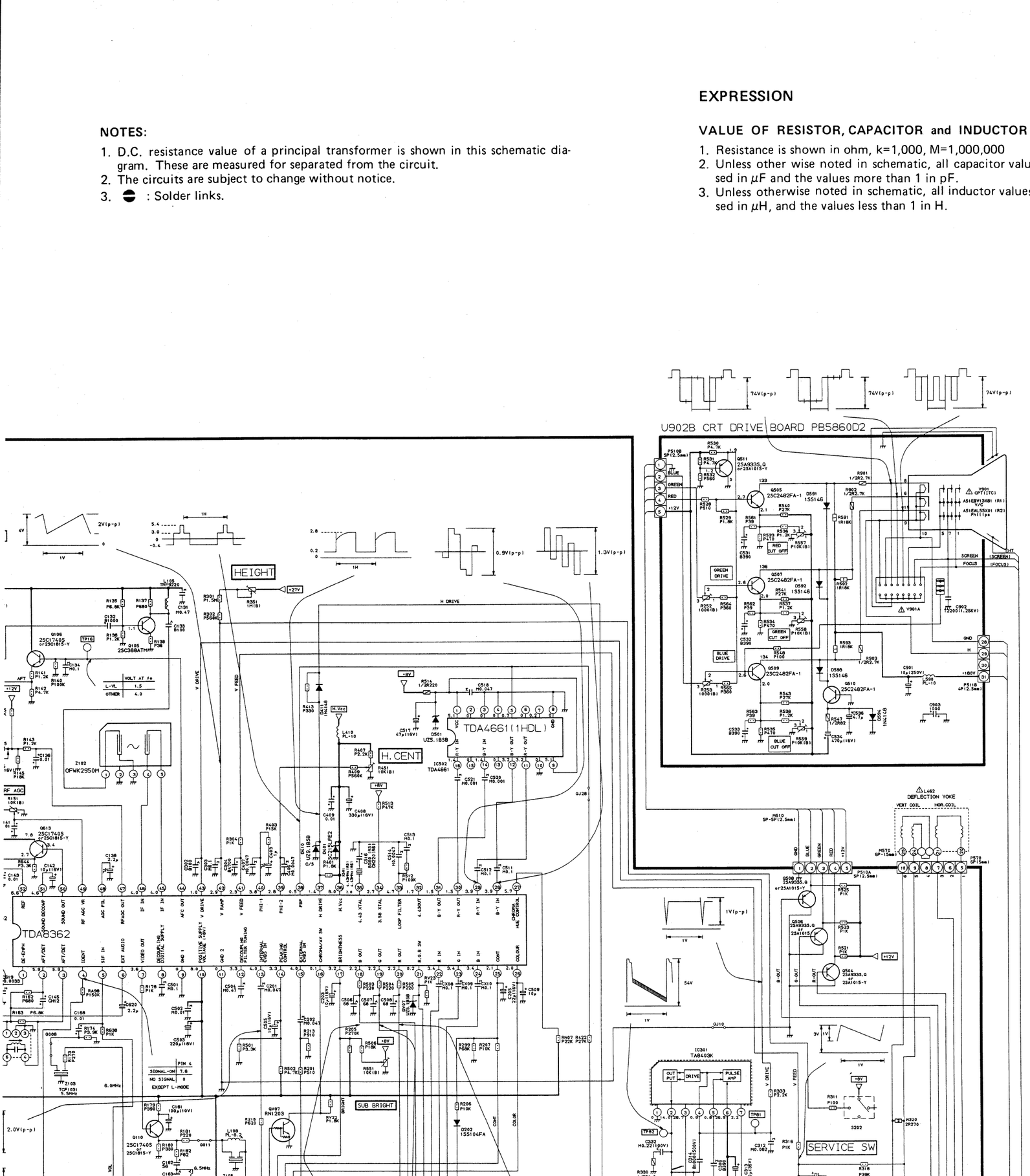
**NOTES:**

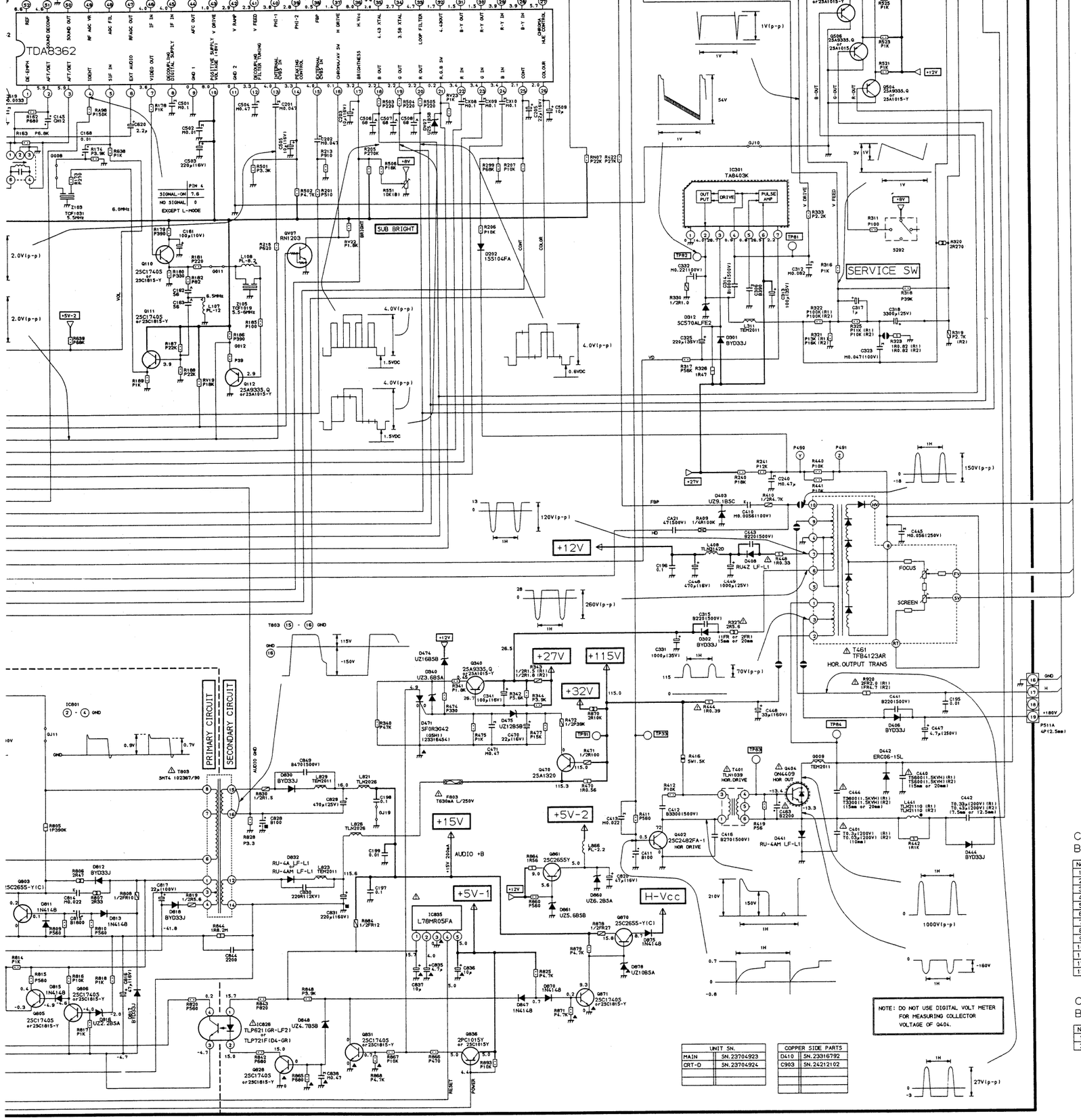
1. D.C. resistance value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⬬ : Solder links.

## EXPRESSION

### VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in $\mu$F and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in $\mu$H, and the values less than 1 in H.






| UNIT SN. | |
|---|---|
| MAIN | SN.23704923 |
| CRT-D | SN.23704924 |
| | |
| | |

| COPPER SIDE PARTS | |
|---|---|
| D410 | SN.23316792 |
| C903 | SN.24212102 |
| | |
| | |

C4ER CIRCUIT SPEC COMPONENT VALUES BY CPT TYPE

| No. | Loc.No. | R1 | R2 |
|---|---|---|---|
| 1 | V901 | A51EAL55X01(PHILIPS) | A51EBV13X81(VIDEO COLOR) |
| 2 | C401 | T0.03μ(200V) | T0.03μ(200V) |
| 3 | C440 | T5600(1.5KVH) | T5600(1.5KVH) |
| 4 | C442 | T0.43μ(200V) | T0.43μ(200V) |
| 5 | C444 | T3600(1.5KVH) | T3300(1.5KVH) |
| 6 | L441 | TLN2111G | TLN2111G |
| 7 | R920 | 1FR4.7 | 2FR2.0 |
| 8 | R321 | P13K | P16K |
| 9 | R322 | P100K | P100K |
| 10 | R323 | 1R0.82 | 1R0.82 |
| 11 | R325 | P11K | P10K |
| 12 | R319 | NOT REQ'D | 1/2R1.5K |
| 13 | R343 | 1/2R1.5 | 1/2R1.8 |

C4ER CIRCUIT SPEC COMPONENT VALUES BY CRYSTAL TYPE(SUPPLIER)

| No. | Loc.No. | R5 | R6 |
|---|---|---|---|
| 1 | X501 | 4.43MHz (N.D.K.) | 4.43MHz (PHILIPS) |
| 2 | C516 | B560 | CH220 |

## SPECIFICATIONS

| | |
|---|---|
| **Input Power Rating:** | 73 watts, AC 220 volts, 50 Hz |
| **Aerial Input Impedance:** | 75 ohm unbalanced type for VHF, UHF and CATV |
| **Receiving Channels:** | **PAL-B/G Standard:**<br>VHF ..... channels 2 to 4, 5 to 12 and S1 to S20<br>UHF ..... channels 21 to 69 |
| **Intermediate Frequencies:** | Picture I-F carrier frequency ..... 38.9 MHz<br>Sound I-F carrier frequency ..... 33.4 MHz<br>Colour sub-carrier frequency ..... 34.47 MHz |
| **Picture Tube:** | 21 inches, A51EFS43X69, 510 mm (measured on diagonal of viewable picture area), 90° deflection |
| **Sound Output:** | 1.5 watts (at 10% harmonic distortion) x 1 |
| **Speakers:** | 77 mm round 1 pc |
| **Aux. Terminals:** | Headphone Jack, 21 pin socket (FULL), A/V INPUT socket |
| **Dimensions:** | Height ..... 476 mm<br>Width ..... 530 mm<br>Depth ..... 485 mm |
| **Mass:** | 19.7 kg |

Specifications are subject to change without notice.

**TOSHIBA CORPORATION**
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-01, JAPAN